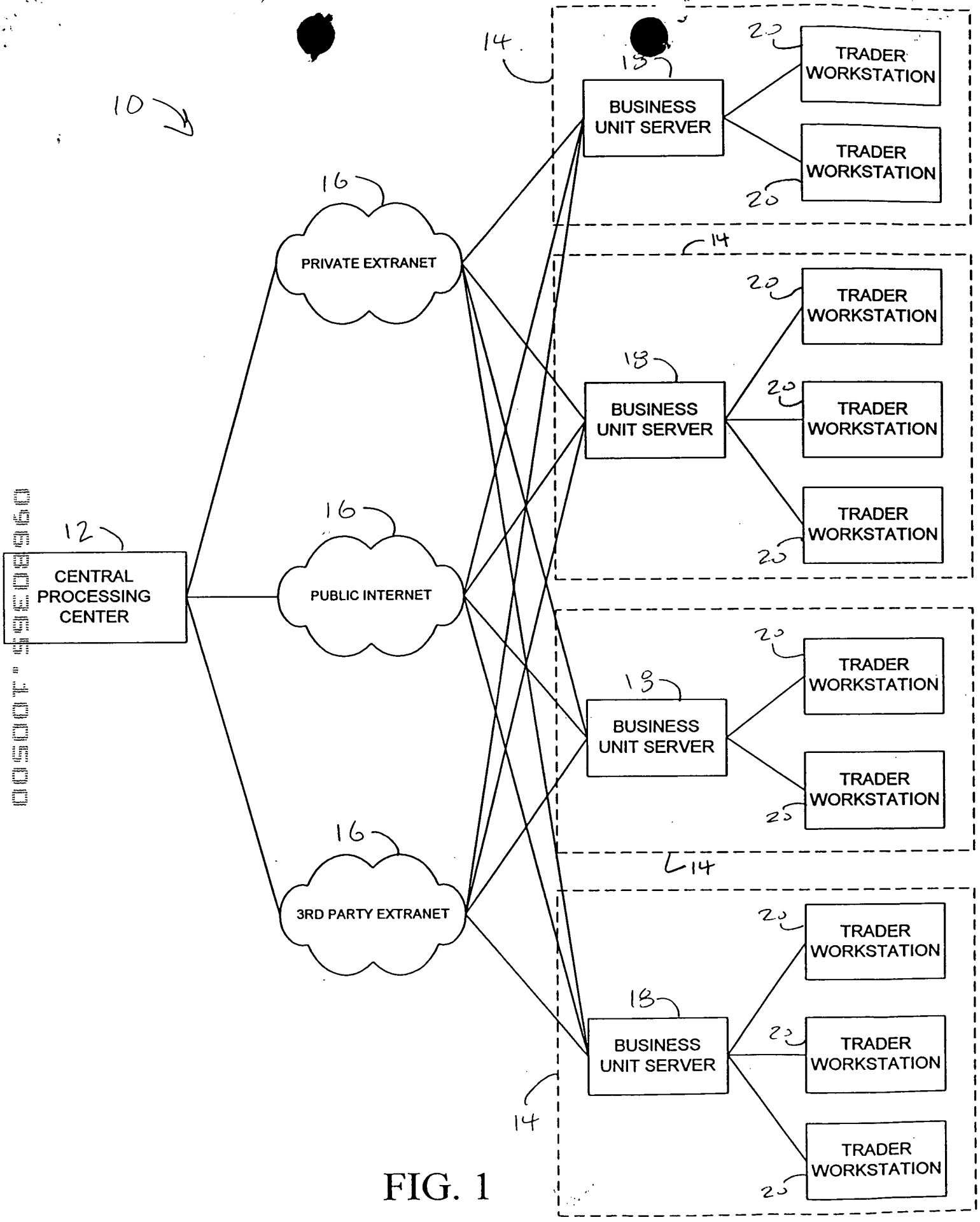
10
12
CENTRAL PROCESSING CENTER
16
PRIVATE EXTRANET
16
PUBLIC INTERNET
16
3RD PARTY EXTRANET
14
18
BUSINESS UNIT SERVER
20
TRADER WORKSTATION
20
TRADER WORKSTATION
14
18
BUSINESS UNIT SERVER
20
TRADER WORKSTATION
20
TRADER WORKSTATION
20
TRADER WORKSTATION
14
18
BUSINESS UNIT SERVER
20
TRADER WORKSTATION
20
TRADER WORKSTATION
14
18
BUSINESS UNIT SERVER
20
TRADER WORKSTATION
20
TRADER WORKSTATION
20
TRADER WORKSTATION

FIG. 1

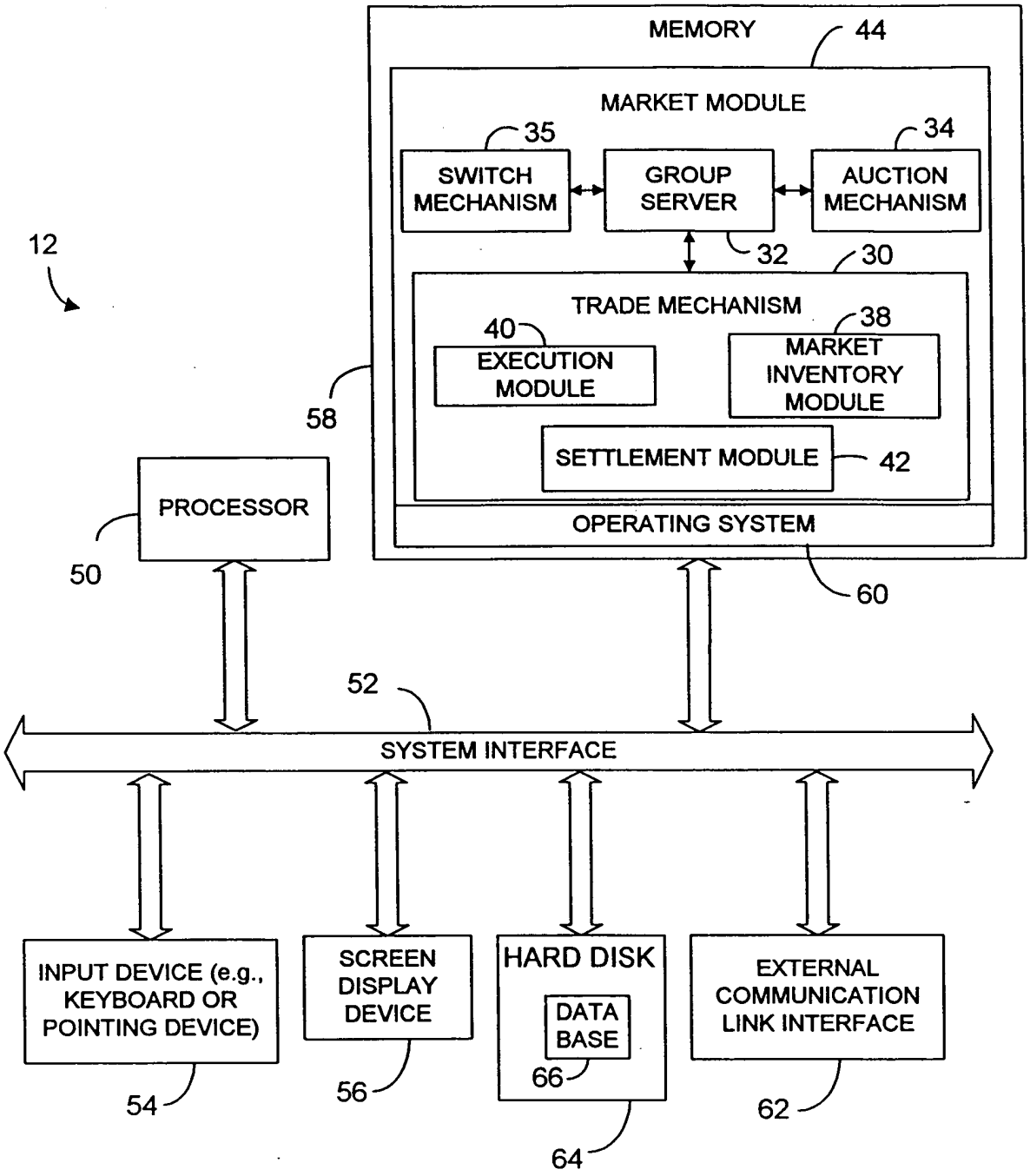
MEMORY
44
MARKET MODULE
35
34
SWITCH MECHANISM
GROUP SERVER
AUCTION MECHANISM
12
32
30
TRADE MECHANISM
40
38
EXECUTION MODULE
MARKET INVENTORY MODULE
58
SETTLEMENT MODULE
42
PROCESSOR
OPERATING SYSTEM
50
60
52
SYSTEM INTERFACE
INPUT DEVICE (e.g., KEYBOARD OR POINTING DEVICE)
SCREEN DISPLAY DEVICE
HARD DISK
DATA BASE
EXTERNAL COMMUNICATION LINK INTERFACE
54
56
66
62
64

FIG. 2

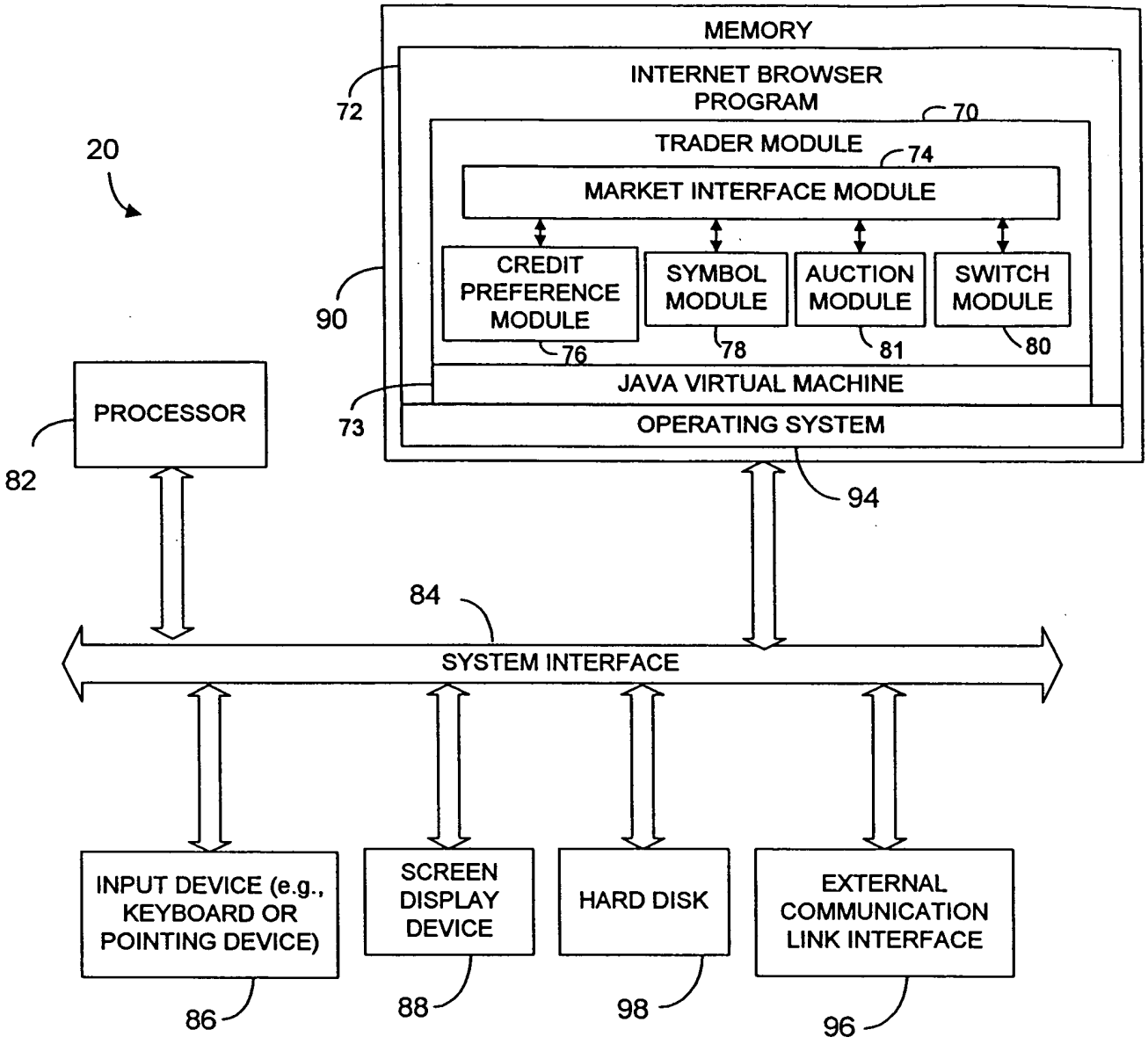
MEMORY
INTERNET BROWSER PROGRAM
72
70
TRADER MODULE
74
MARKET INTERFACE MODULE
20
CREDIT PREFERENCE MODULE
SYMBOL MODULE
AUCTION MODULE
SWITCH MODULE
90
76
78
81
80
JAVA VIRTUAL MACHINE
PROCESSOR
73
OPERATING SYSTEM
82
94
84
SYSTEM INTERFACE
INPUT DEVICE (e.g., KEYBOARD OR POINTING DEVICE)
SCREEN DISPLAY DEVICE
HARD DISK
EXTERNAL COMMUNICATION LINK INTERFACE
86
88
98
96

FIG. 3

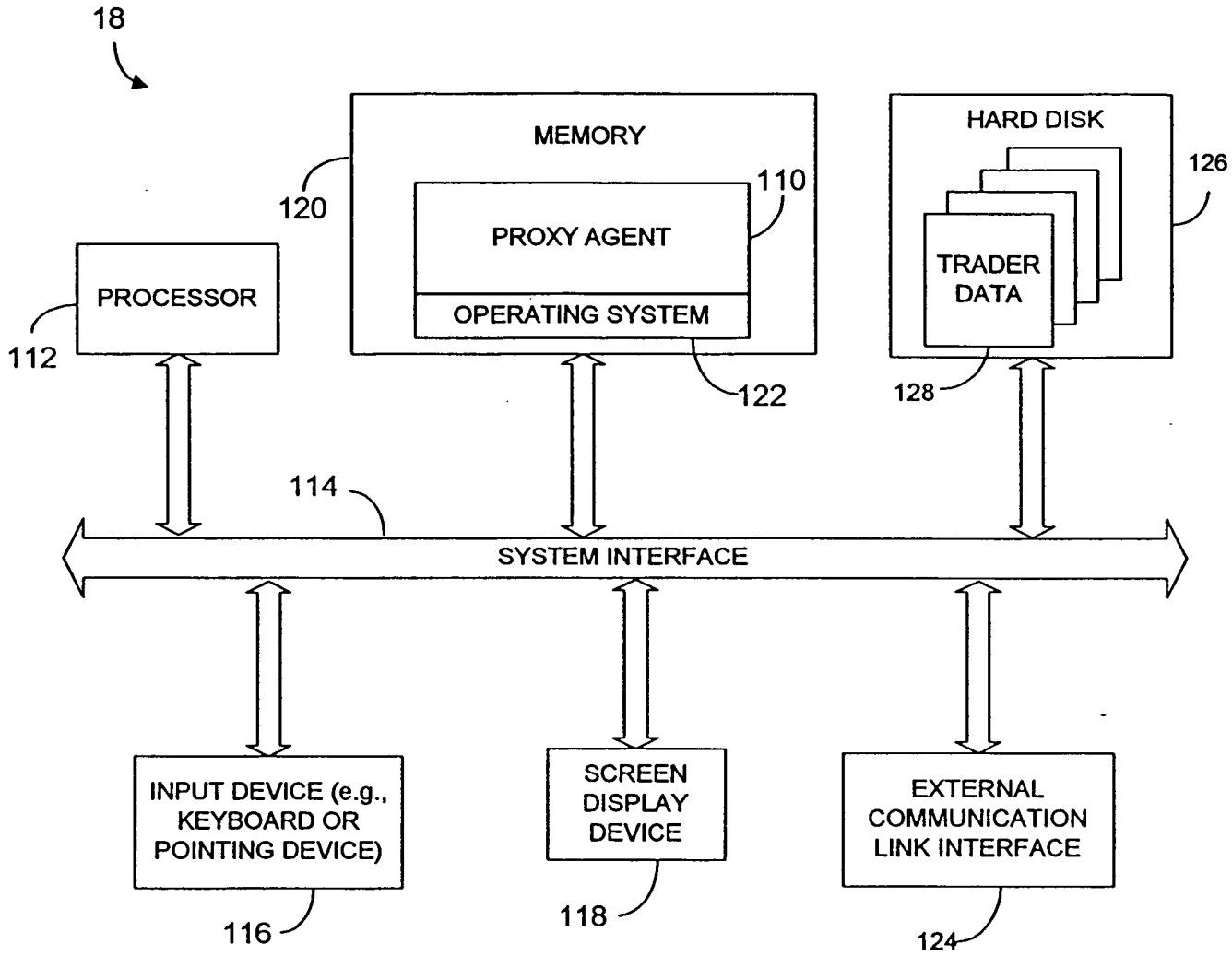
18
MEMORY
120
110
PROXY AGENT
OPERATING SYSTEM
122
HARD DISK
126
TRADER DATA
128
PROCESSOR
112
114
SYSTEM INTERFACE
INPUT DEVICE (e.g., KEYBOARD OR POINTING DEVICE)
116
SCREEN DISPLAY DEVICE
118
EXTERNAL COMMUNICATION LINK INTERFACE
124

FIG. 4

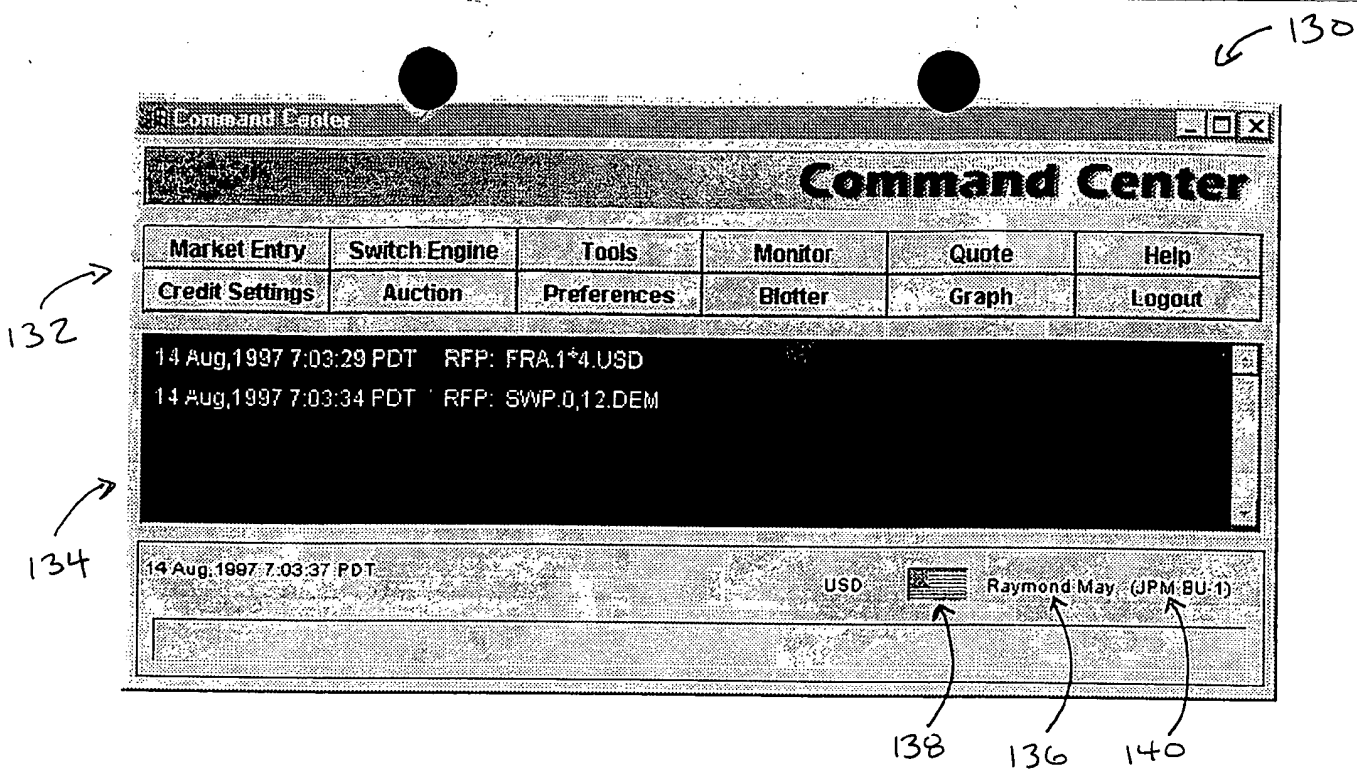

FIG. 5

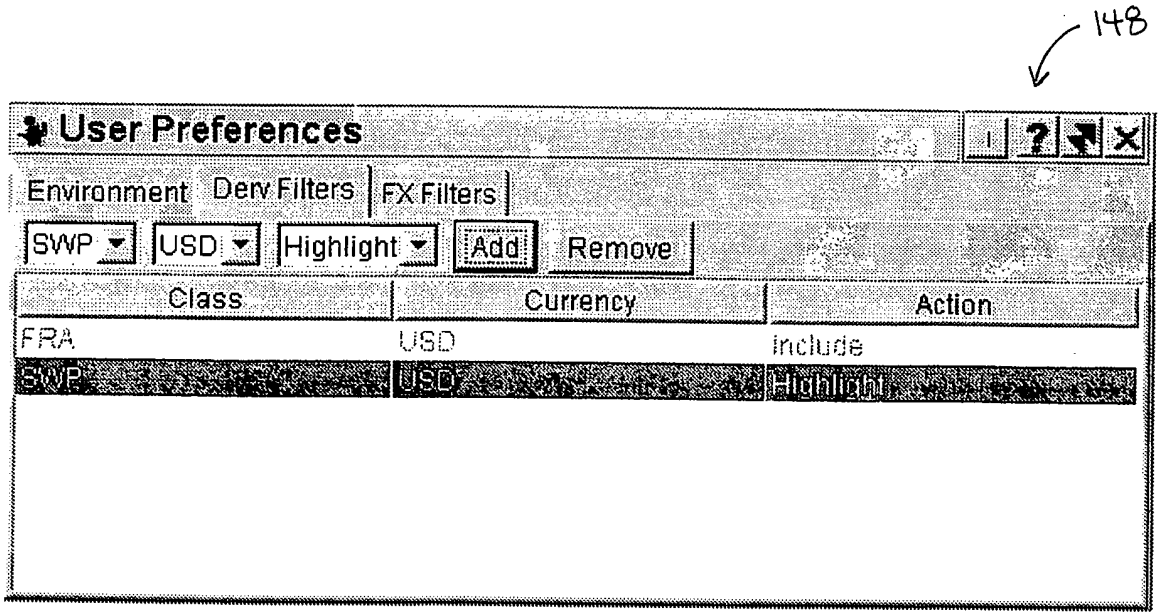

FIG. 6A

06050505-1000506

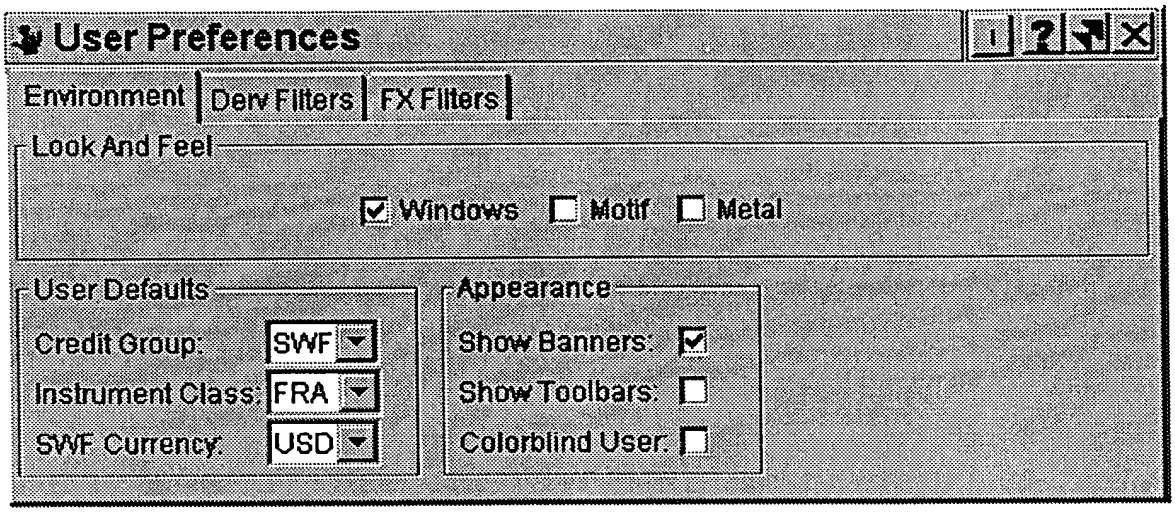

FIG. 6B

05050605.040505

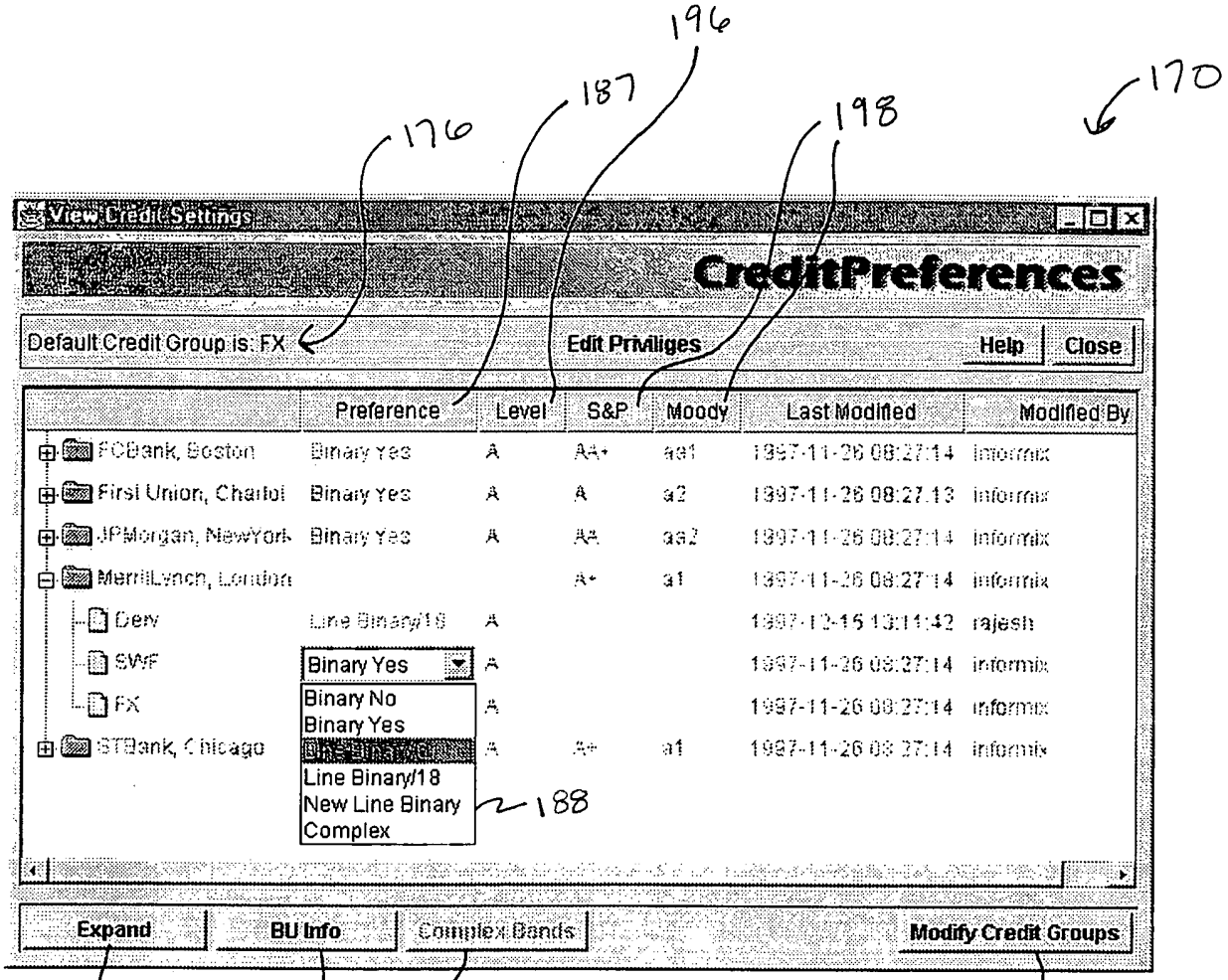
196
187
198
170
176
View Credit Settings
CreditPreferences
Default Credit Group is: FX
Edit Privilges
Help
Close
Preference
Level
S&P
Moody
Last Modified
Modified By
FCBank, Boston
Binary Yes
A
AA+
aa1
1997-11-26 08:27:14
informix
First Union, Charlot
Binary Yes
A
A
a2
1997-11-26 08:27:13
informix
JPMorgan, NewYork
Binary Yes
A
AA
aa2
1997-11-26 08:27:14
informix
MerrillLynch, London
A+
a1
1997-11-26 08:27:14
informix
Gerv
Line Binary/18
A
1997-12-15 13:11:42
rajesh
SWF
Binary Yes
A
1997-11-26 08:27:14
informix
FX
A
1997-11-26 08:27:14
informix
STBank, Chicago
A
A+
a1
1997-11-26 08:27:14
informix
Binary No
Binary Yes
Line Binary/18
New Line Binary
Complex
188
Expand
BU Info
Complex Bands
Modify Credit Groups
174
202
194
178

FIG. 7

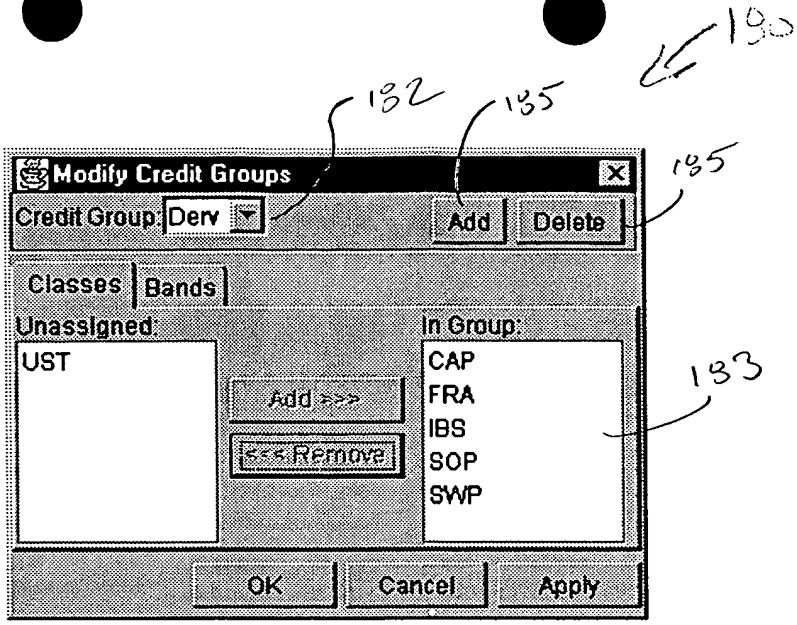
190
182
185
185
Modify Credit Groups
Credit Group: Derv
Add
Delete
Classes
Bands
Unassigned:
In Group:
UST
CAP
FRA
IBS
SOP
SWP
Add >>>
<<< Remove
133
OK
Cancel
Apply

FIG. 8A

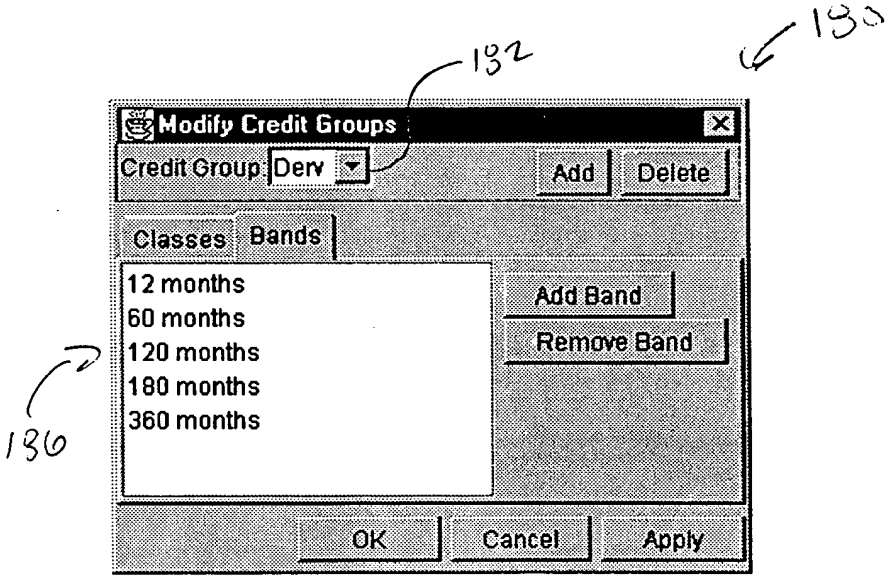
190
182
Modify Credit Groups
Credit Group: Derv
Add
Delete
Classes
Bands
12 months
60 months
120 months
180 months
360 months
Add Band
Remove Band
186
OK
Cancel
Apply

FIG. 8B

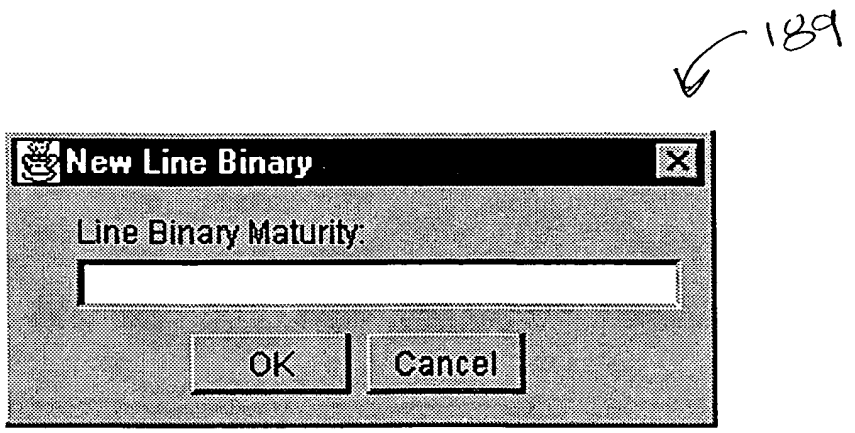

FIG. 9A

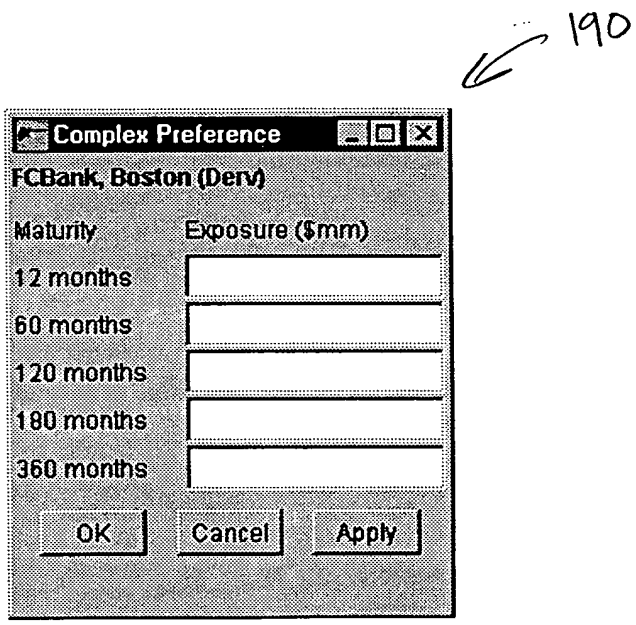

FIG. 9B

09680505 - 040504

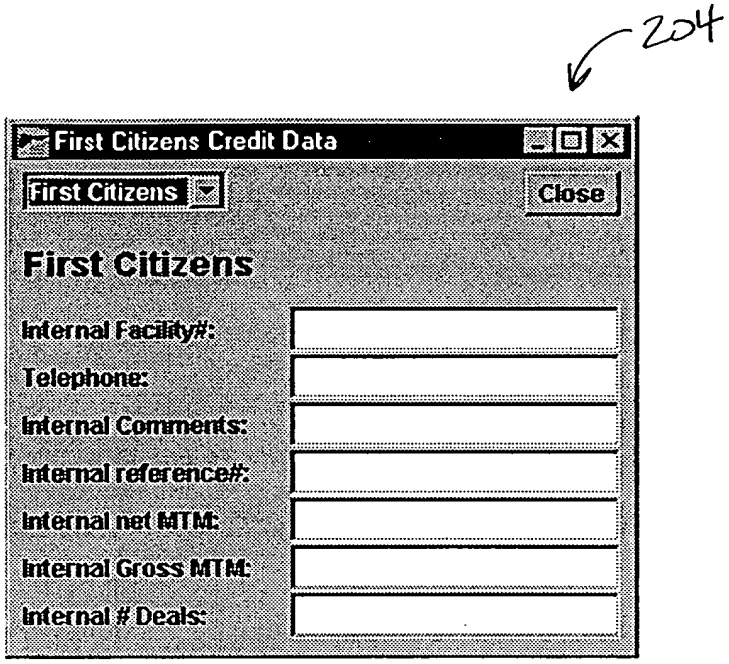
204
First Citizens Credit Data
First Citizens
Close
First Citizens
Internal Facility#:
Telephone:
Internal Comments:
Internal reference#:
Internal net MTM:
Internal Gross MTM:
Internal # Deals:

FIG. 10

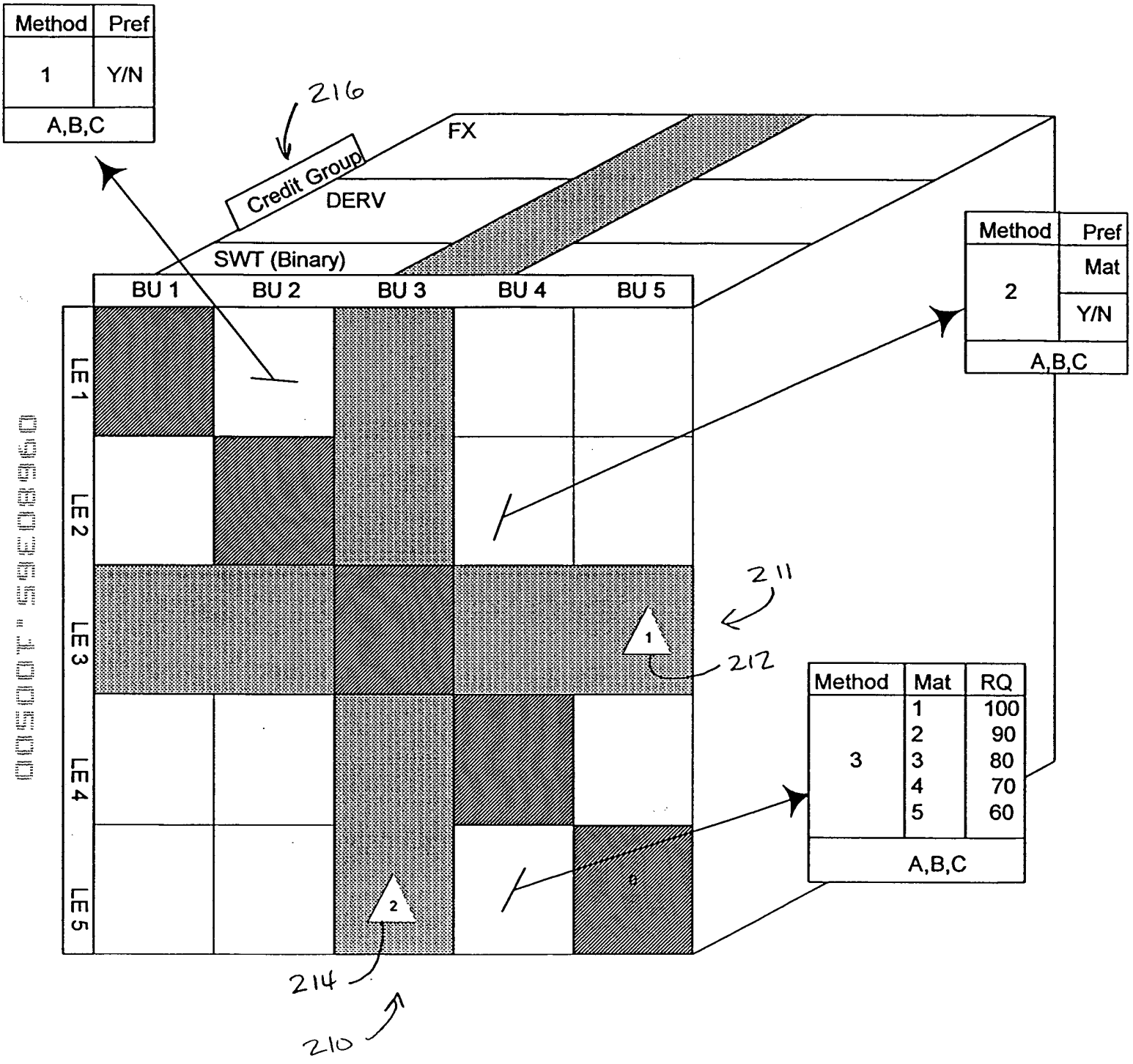
Method
Pref
1
Y/N
A,B,C
216
Credit Group
FX
DERV
SWT (Binary)
BU 1
BU 2
BU 3
BU 4
BU 5
LE 1
LE 2
LE 3
LE 4
LE 5
Method
Pref
Mat
2
Y/N
A,B,C
211
1
212
Method
Mat
RQ
3
1
100
2
90
3
80
4
70
5
60
A,B,C
2
214
210

FIG. 11

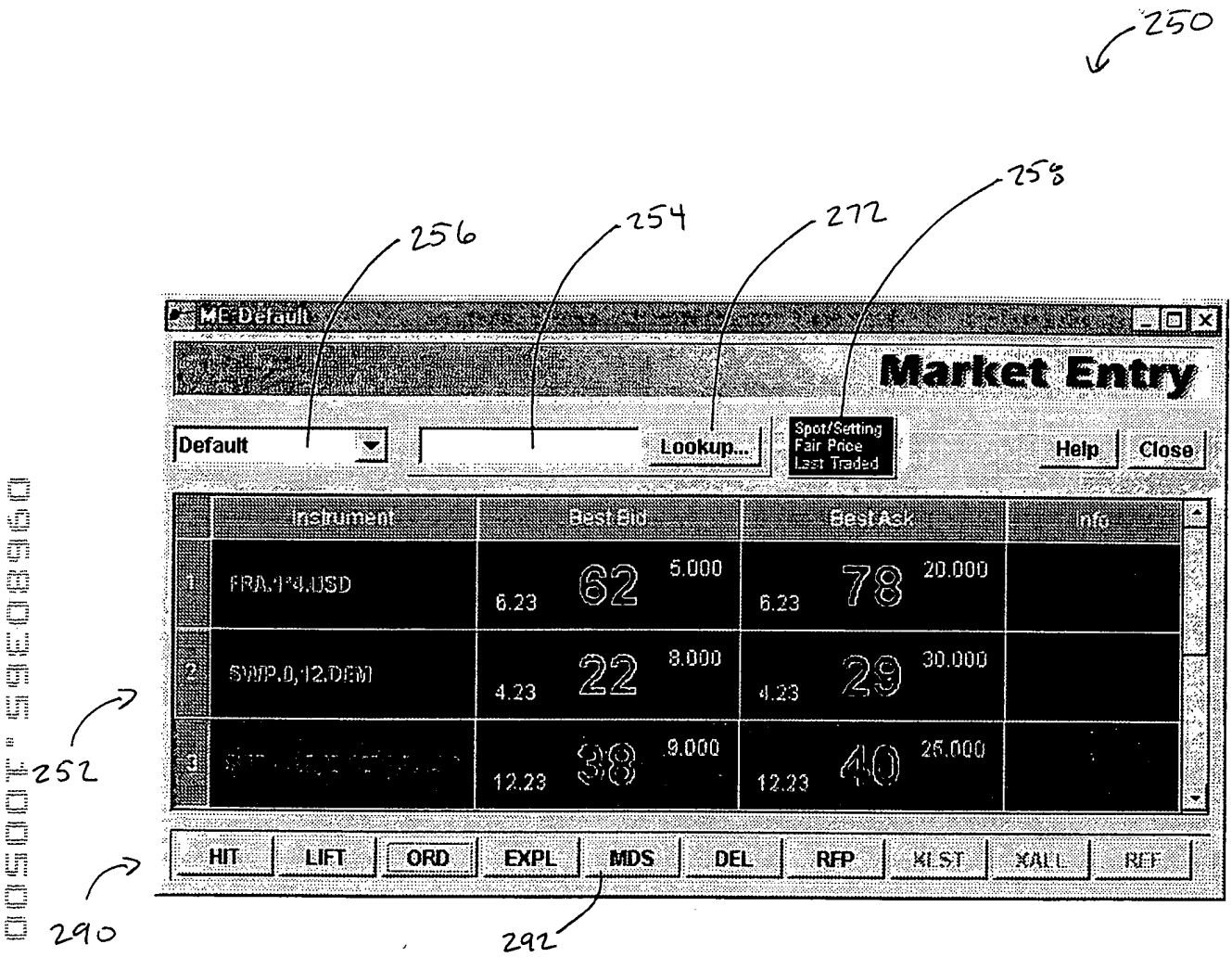
250
256
254
272
258
ME-Default
Market Entry
Default
Lookup...
Spot/Setting
Fair Price
Last Traded
Help
Close
Instrument
Best Bid
Best Ask
Info
1
FRA.1*4.USD
6.23
62
5.000
6.23
78
20.000
2
SWP.0,12.DEM
4.23
22
8.000
4.23
29
30.000
3
12.23
38
9.000
12.23
40
25.000
252
HIT
LIFT
ORD
EXPL
MDS
DEL
RFP
290
292

FIG. 12

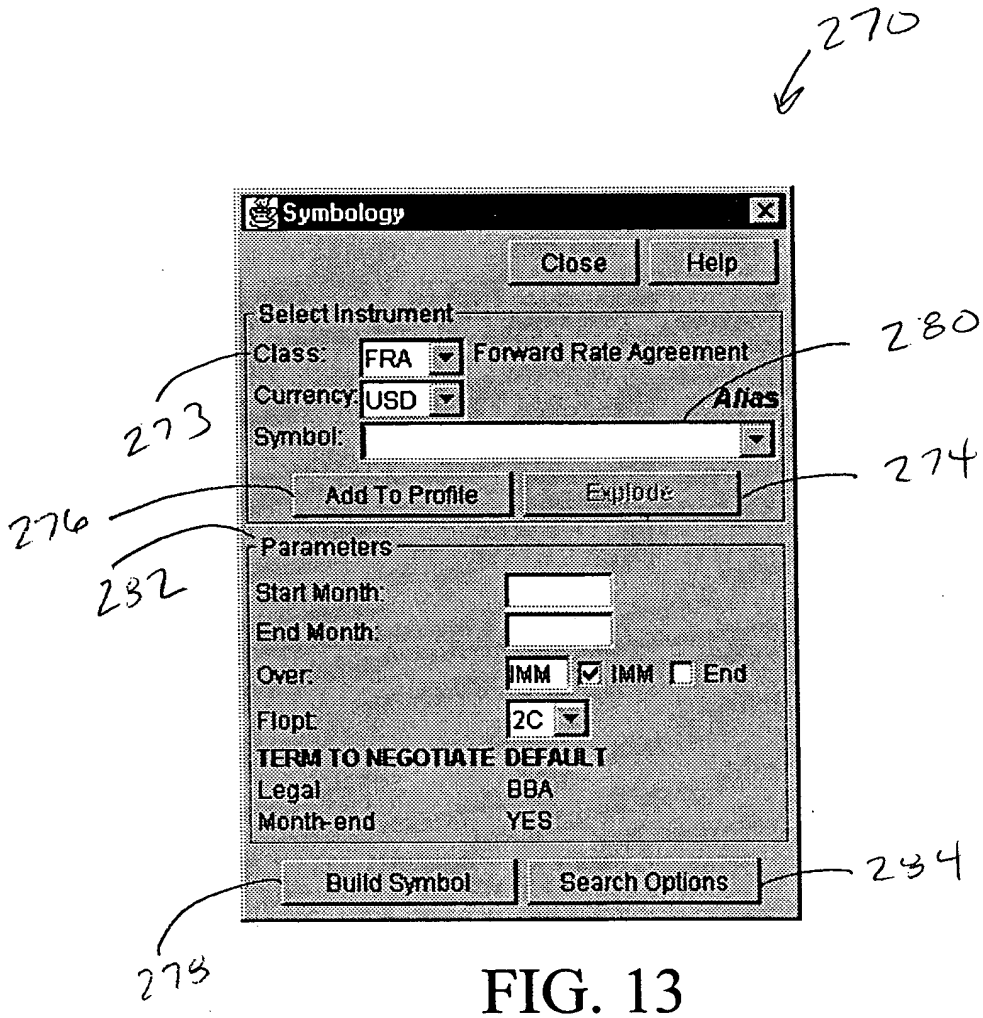
270
Symbology
Close
Help
Select Instrument
Class:
FRA
Forward Rate Agreement
Currency:
USD
Alias
Symbol:
280
273
274
276
Add To Profile
Explode
Parameters
232
Start Month:
End Month:
Over:
IMM
IMM
End
Flopt:
2C
TERM TO NEGOTIATE DEFAULT
Legal
BBA
Month-end
YES
Build Symbol
Search Options
234
278

FIG. 13

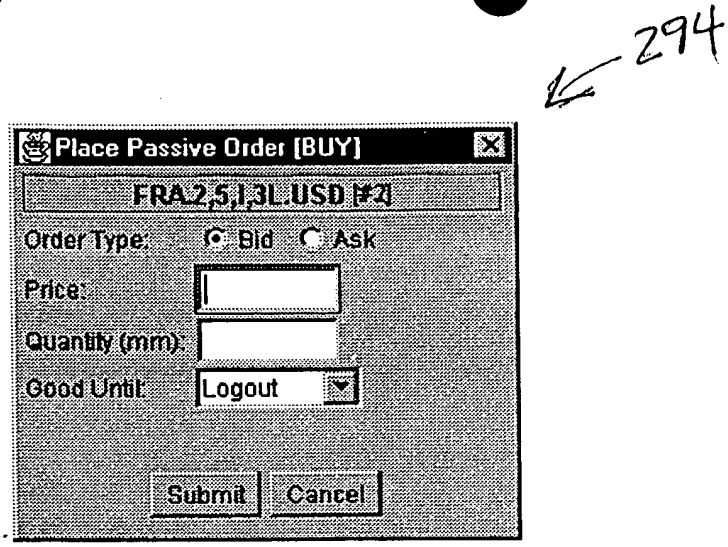

FIG. 14A

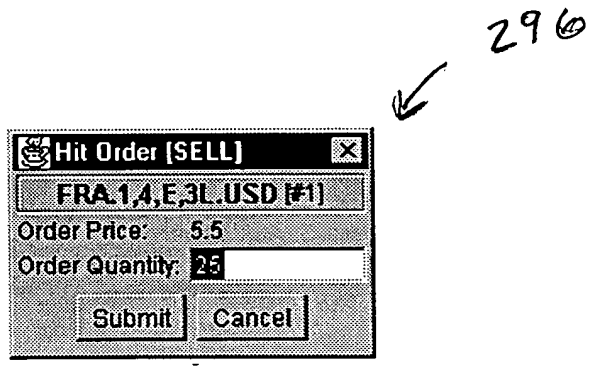

FIG. 14B

9560565 - 4005508

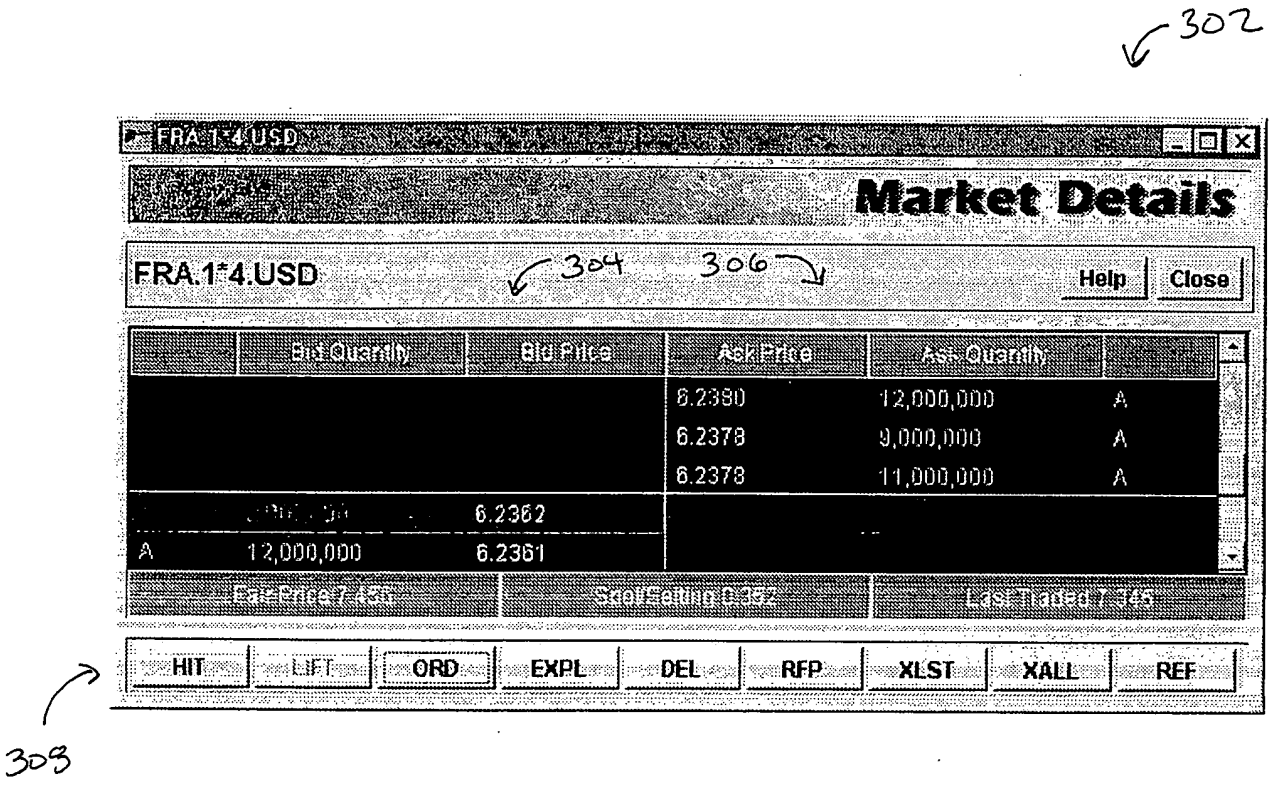
302
FRA.1*4.USD
Market Details
FRA.1*4.USD
304
306
Help
Close
Bid Quantity
Bid Price
Ask Price
Ask Quantity
6.2380
12,000,000
A
6.2378
9,000,000
A
6.2378
11,000,000
A
6.2362
A
12,000,000
6.2361
HIT
LIFT
ORD
EXPL
DEL
RFP
XLST
XALL
REF
308

FIG. 15

320

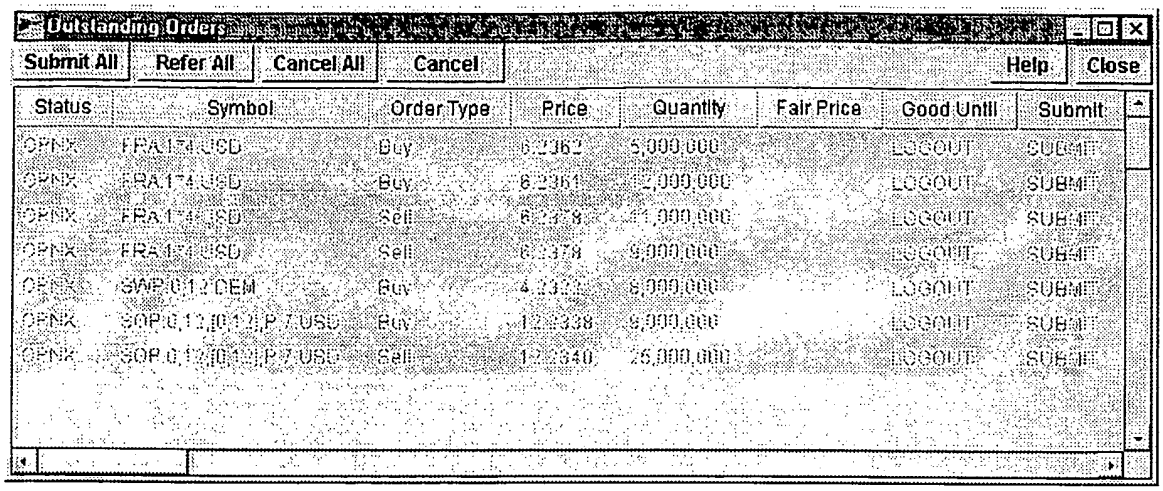

FIG. 16

330

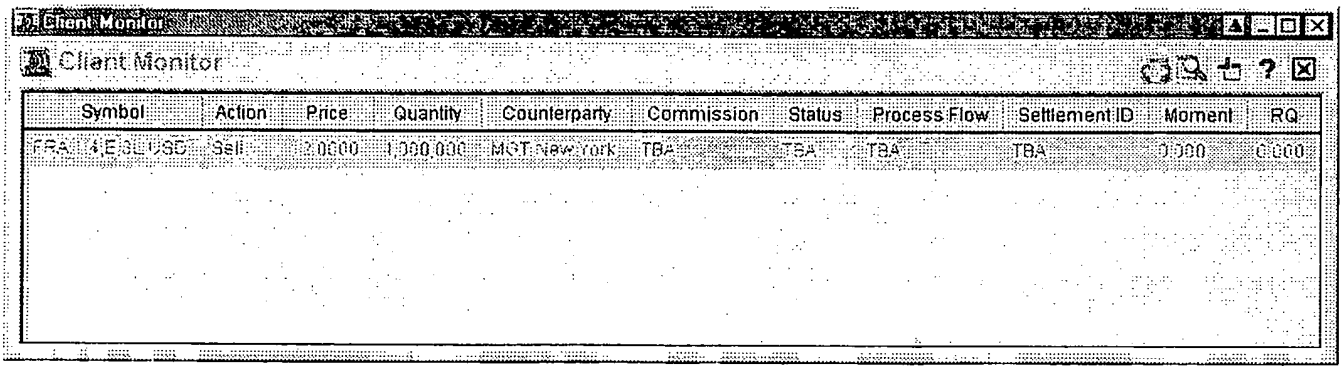

FIG. 17

09568365 - 100500

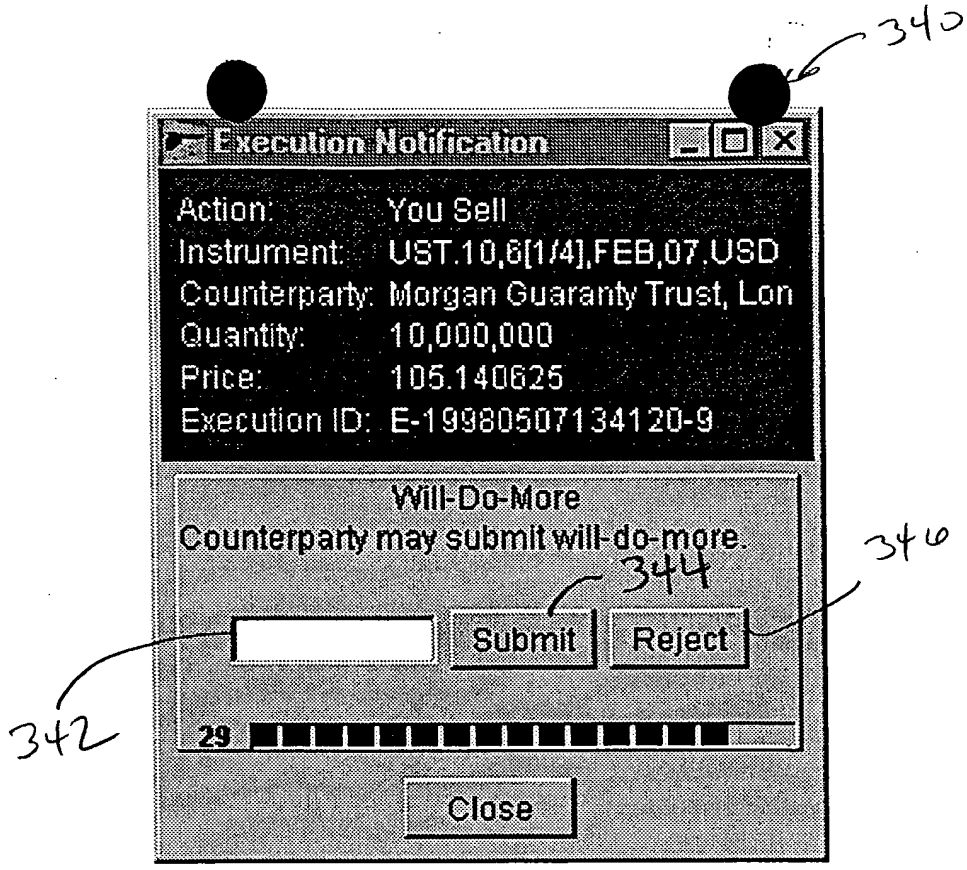
340
Execution Notification
Action: You Sell
Instrument: UST.10,6[1/4],FEB,07.USD
Counterparty: Morgan Guaranty Trust, Lon
Quantity: 10,000,000
Price: 105.140625
Execution ID: E-19980507134120-9
Will-Do-More
Counterparty may submit will-do-more.
344
346
Submit
Reject
342
29
Close

FIG. 18

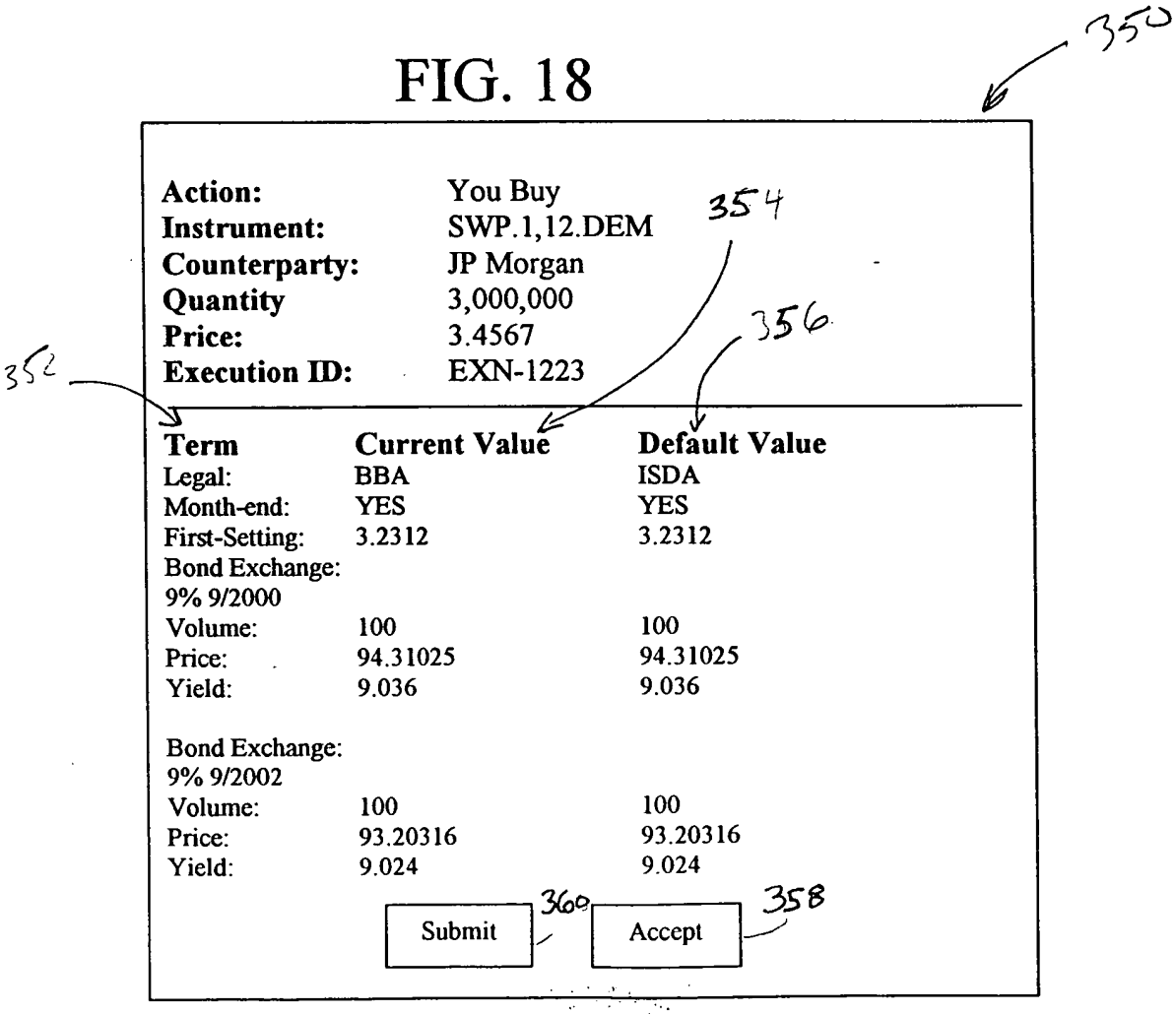
350
Action: You Buy
Instrument: SWP.1,12.DEM
Counterparty: JP Morgan
Quantity 3,000,000
Price: 3.4567
Execution ID: EXN-1223
354
356
352
Term
Current Value
Default Value
Legal: BBA ISDA
Month-end: YES YES
First-Setting: 3.2312 3.2312
Bond Exchange:
9% 9/2000
Volume: 100 100
Price: 94.31025 94.31025
Yield: 9.036 9.036
Bond Exchange:
9% 9/2002
Volume: 100 100
Price: 93.20316 93.20316
Yield: 9.024 9.024
Submit
360
Accept
358

FIG. 19

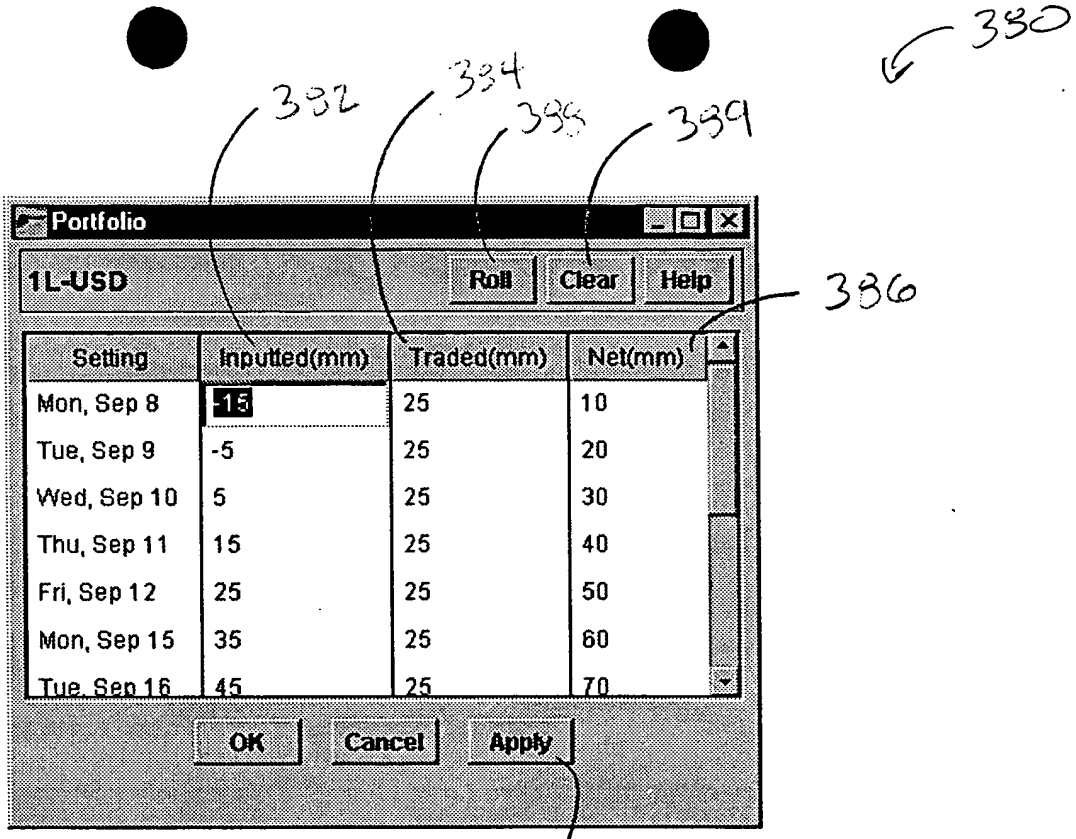
380
392
394
393
391
Portfolio
1L-USD
Roll
Clear
Help
396
Setting
Inputted(mm)
Traded(mm)
Net(mm)
Mon, Sep 8
-15
25
10
Tue, Sep 9
-5
25
20
Wed, Sep 10
5
25
30
Thu, Sep 11
15
25
40
Fri, Sep 12
25
25
50
Mon, Sep 15
35
25
60
Tue, Sep 16
45
25
70
OK
Cancel
Apply
391

FIG. 20

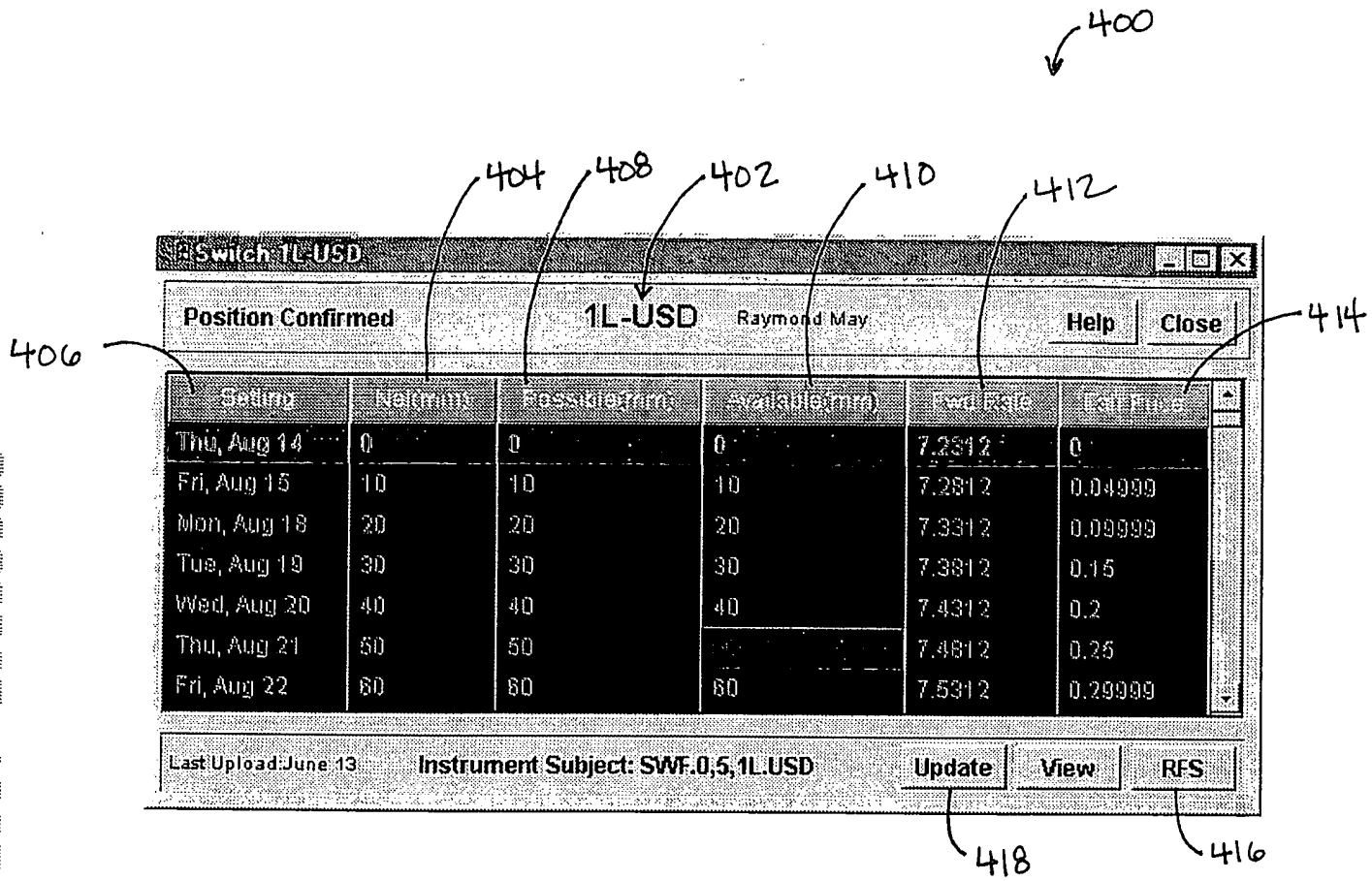
400
404
408
402
410
412
406
414
Switch 1L-USD
Position Confirmed
1L-USD
Raymond May
Help
Close
Settlmt
Min
Possible
Available
Fwd Rate
Difference
Thu, Aug 14 0 0 0 7.2312 0
Fri, Aug 15 10 10 10 7.2812 0.04999
Mon, Aug 18 20 20 20 7.3312 0.09999
Tue, Aug 19 30 30 30 7.3812 0.15
Wed, Aug 20 40 40 40 7.4312 0.2
Thu, Aug 21 50 50 7.4812 0.25
Fri, Aug 22 60 60 60 7.5312 0.29999
Last Upload:June 13
Instrument Subject: SWF.0,5,1L.USD
Update
View
RFS
418
416

FIG. 21

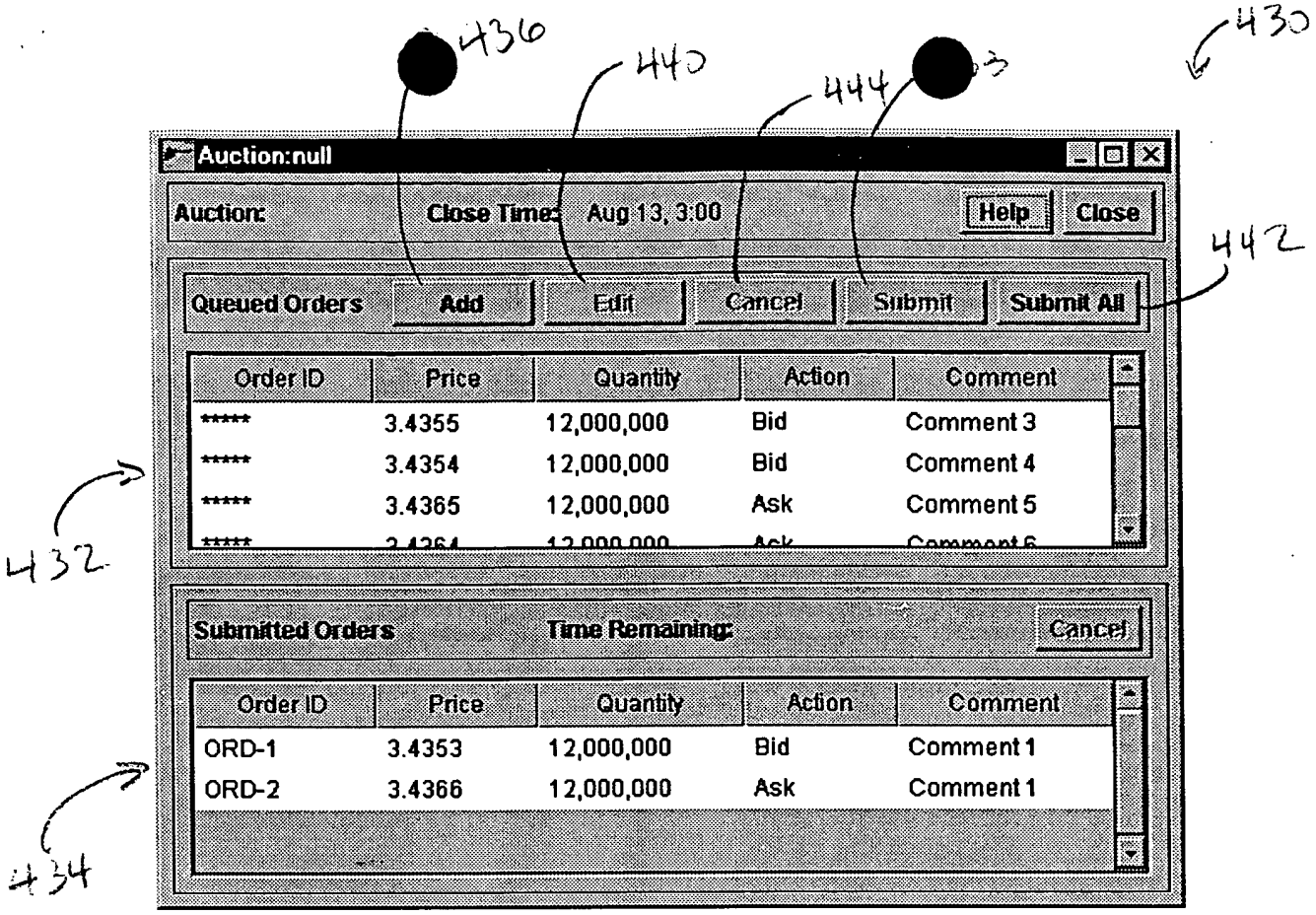

FIG. 22A

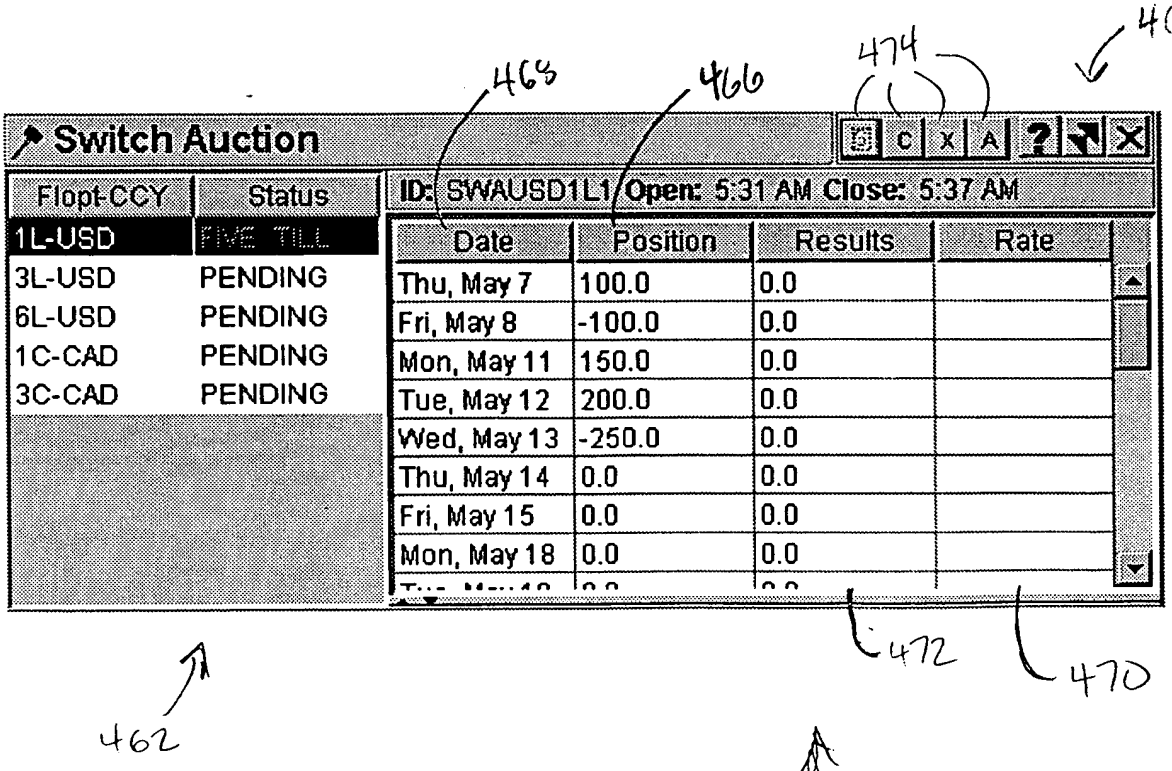

FIG. 22B

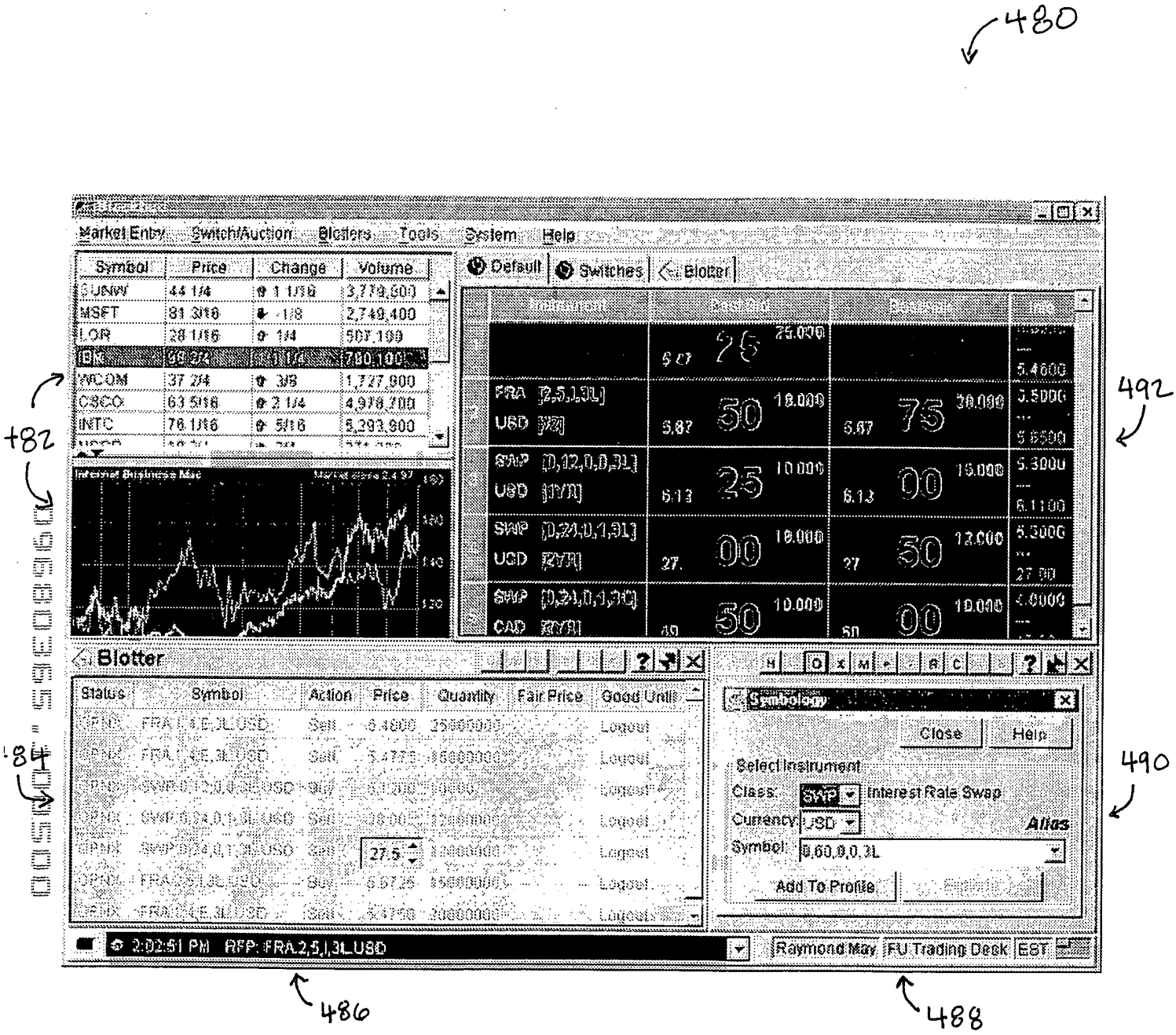
480
482
484
490
492
486
488
Market Entry
Switch/Auction
Blotters
Tools
System
Help
Symbol
Price
Change
Volume
Default
Switches
Blotter
Status
Action
Close
Help
Select Instrument
Class:
Interest Rate Swap
Currency:
Alias
Symbol:
Add To Profile
2:02:51 PM
RFP: FRA,2,5,1,3L,USD
Raymond May
FU Trading Desk
EST

FIG. 23

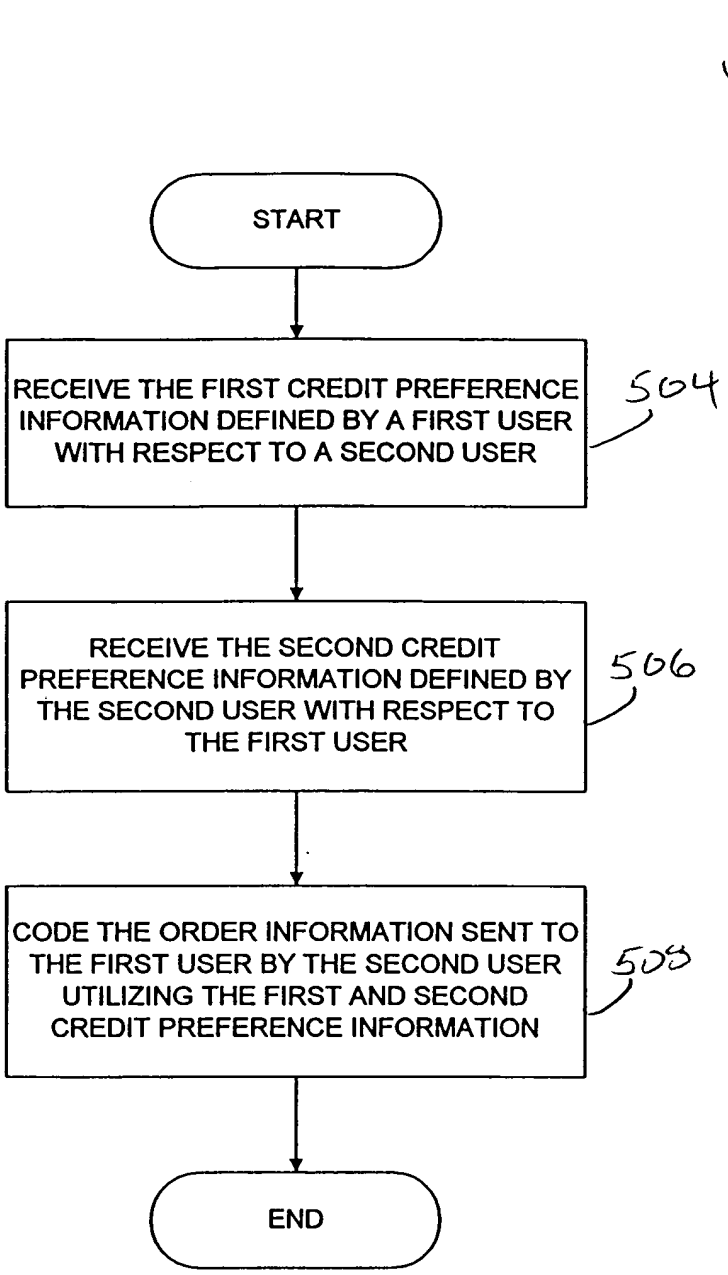
502
START
RECEIVE THE FIRST CREDIT PREFERENCE INFORMATION DEFINED BY A FIRST USER WITH RESPECT TO A SECOND USER
504
RECEIVE THE SECOND CREDIT PREFERENCE INFORMATION DEFINED BY THE SECOND USER WITH RESPECT TO THE FIRST USER
506
CODE THE ORDER INFORMATION SENT TO THE FIRST USER BY THE SECOND USER UTILIZING THE FIRST AND SECOND CREDIT PREFERENCE INFORMATION
508
END

FIG. 24

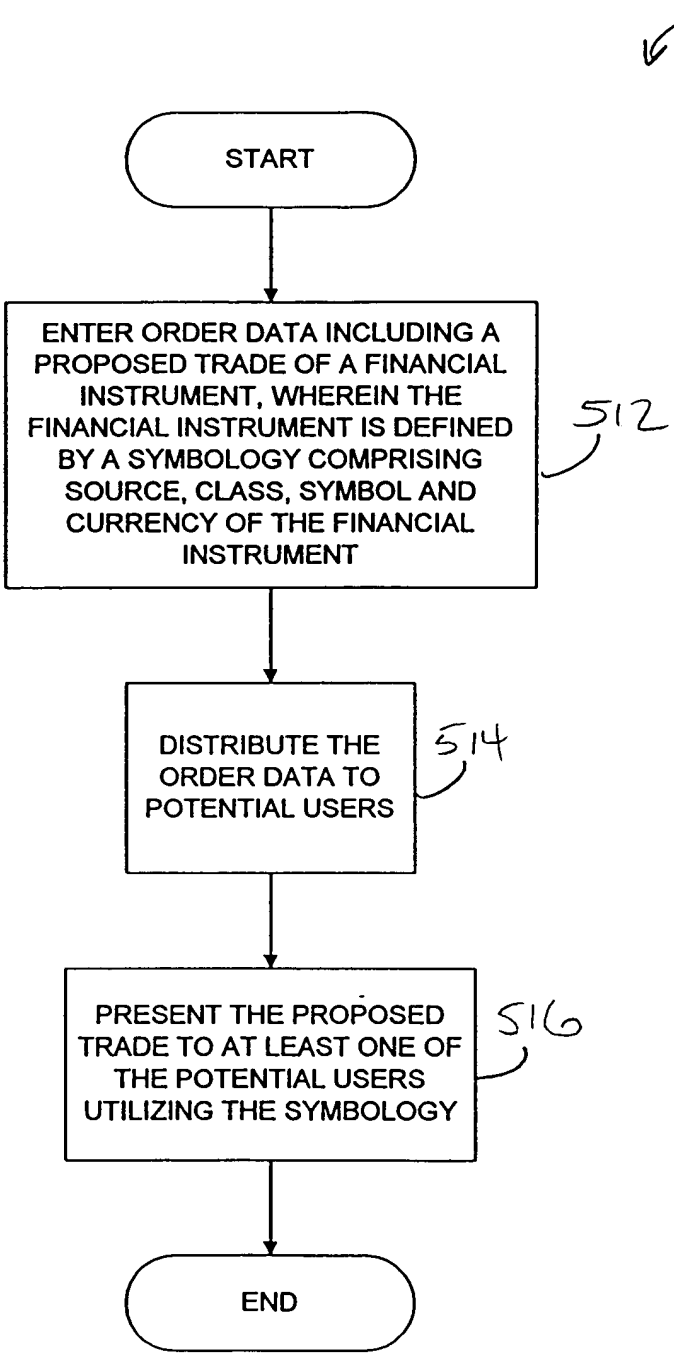
510
START
ENTER ORDER DATA INCLUDING A PROPOSED TRADE OF A FINANCIAL INSTRUMENT, WHEREIN THE FINANCIAL INSTRUMENT IS DEFINED BY A SYMBOLOGY COMPRISING SOURCE, CLASS, SYMBOL AND CURRENCY OF THE FINANCIAL INSTRUMENT
512
DISTRIBUTE THE ORDER DATA TO POTENTIAL USERS
514
PRESENT THE PROPOSED TRADE TO AT LEAST ONE OF THE POTENTIAL USERS UTILIZING THE SYMBOLOGY
516
END

FIG. 25

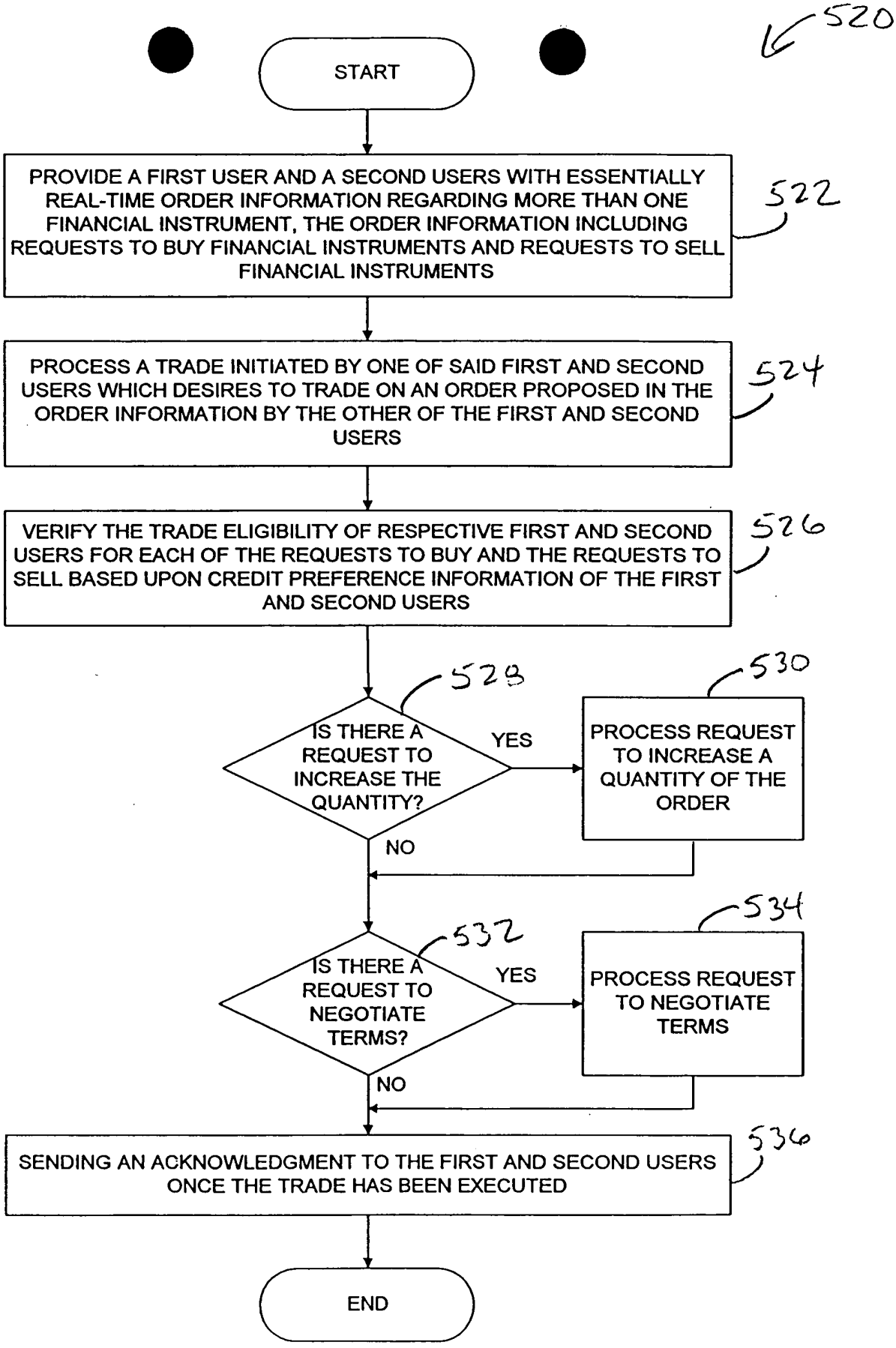
520
START
PROVIDE A FIRST USER AND A SECOND USERS WITH ESSENTIALLY REAL-TIME ORDER INFORMATION REGARDING MORE THAN ONE FINANCIAL INSTRUMENT, THE ORDER INFORMATION INCLUDING REQUESTS TO BUY FINANCIAL INSTRUMENTS AND REQUESTS TO SELL FINANCIAL INSTRUMENTS
522
PROCESS A TRADE INITIATED BY ONE OF SAID FIRST AND SECOND USERS WHICH DESIRES TO TRADE ON AN ORDER PROPOSED IN THE ORDER INFORMATION BY THE OTHER OF THE FIRST AND SECOND USERS
524
VERIFY THE TRADE ELIGIBILITY OF RESPECTIVE FIRST AND SECOND USERS FOR EACH OF THE REQUESTS TO BUY AND THE REQUESTS TO SELL BASED UPON CREDIT PREFERENCE INFORMATION OF THE FIRST AND SECOND USERS
526
IS THERE A REQUEST TO INCREASE THE QUANTITY?
528
YES
PROCESS REQUEST TO INCREASE A QUANTITY OF THE ORDER
530
NO
IS THERE A REQUEST TO NEGOTIATE TERMS?
532
YES
PROCESS REQUEST TO NEGOTIATE TERMS
534
NO
SENDING AN ACKNOWLEDGMENT TO THE FIRST AND SECOND USERS ONCE THE TRADE HAS BEEN EXECUTED
536
END

FIG. 26

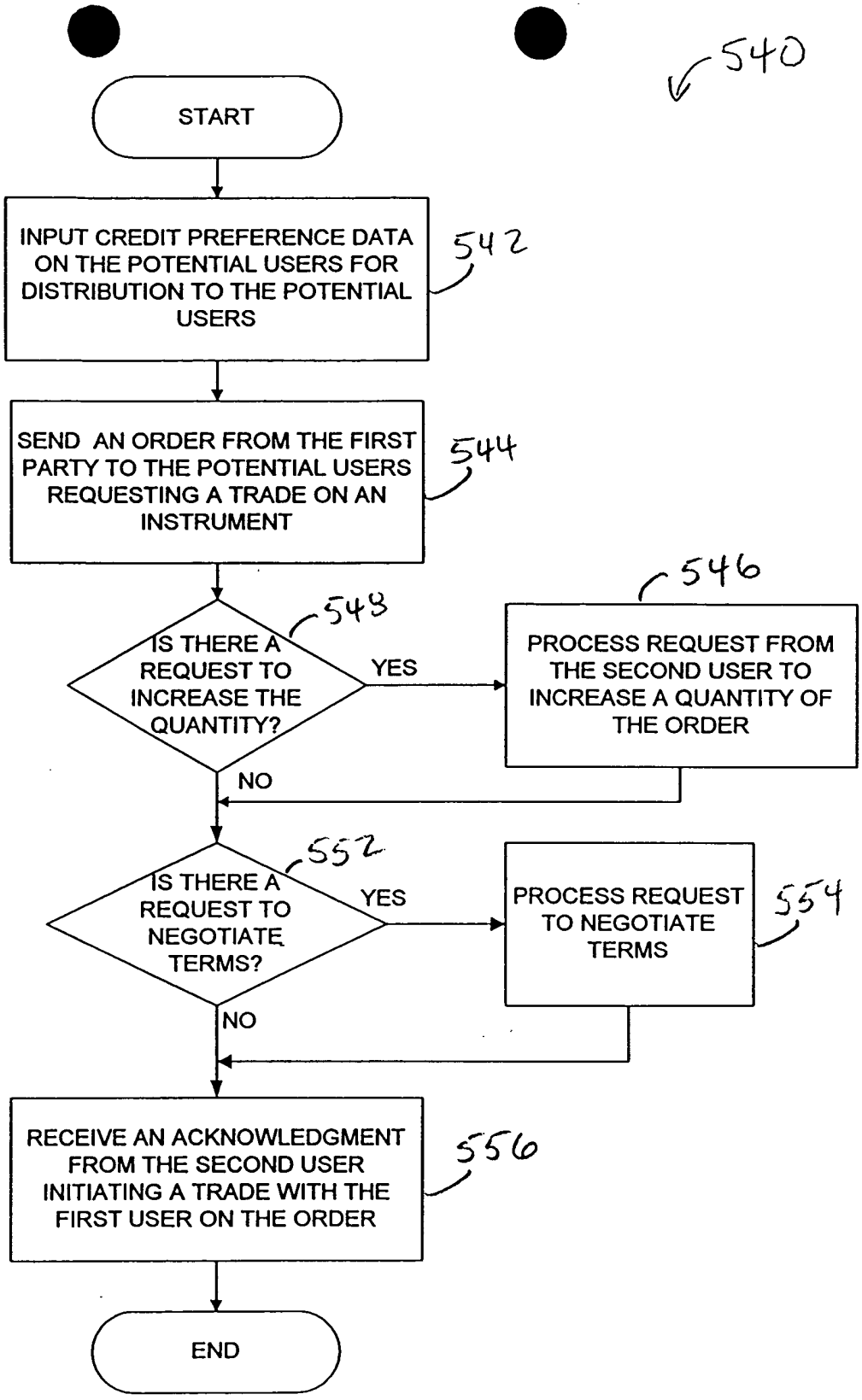
540
START
INPUT CREDIT PREFERENCE DATA ON THE POTENTIAL USERS FOR DISTRIBUTION TO THE POTENTIAL USERS
542
SEND AN ORDER FROM THE FIRST PARTY TO THE POTENTIAL USERS REQUESTING A TRADE ON AN INSTRUMENT
544
546
548
IS THERE A REQUEST TO INCREASE THE QUANTITY?
YES
PROCESS REQUEST FROM THE SECOND USER TO INCREASE A QUANTITY OF THE ORDER
NO
552
IS THERE A REQUEST TO NEGOTIATE TERMS?
YES
PROCESS REQUEST TO NEGOTIATE TERMS
554
NO
RECEIVE AN ACKNOWLEDGMENT FROM THE SECOND USER INITIATING A TRADE WITH THE FIRST USER ON THE ORDER
556
END

FIG. 27A

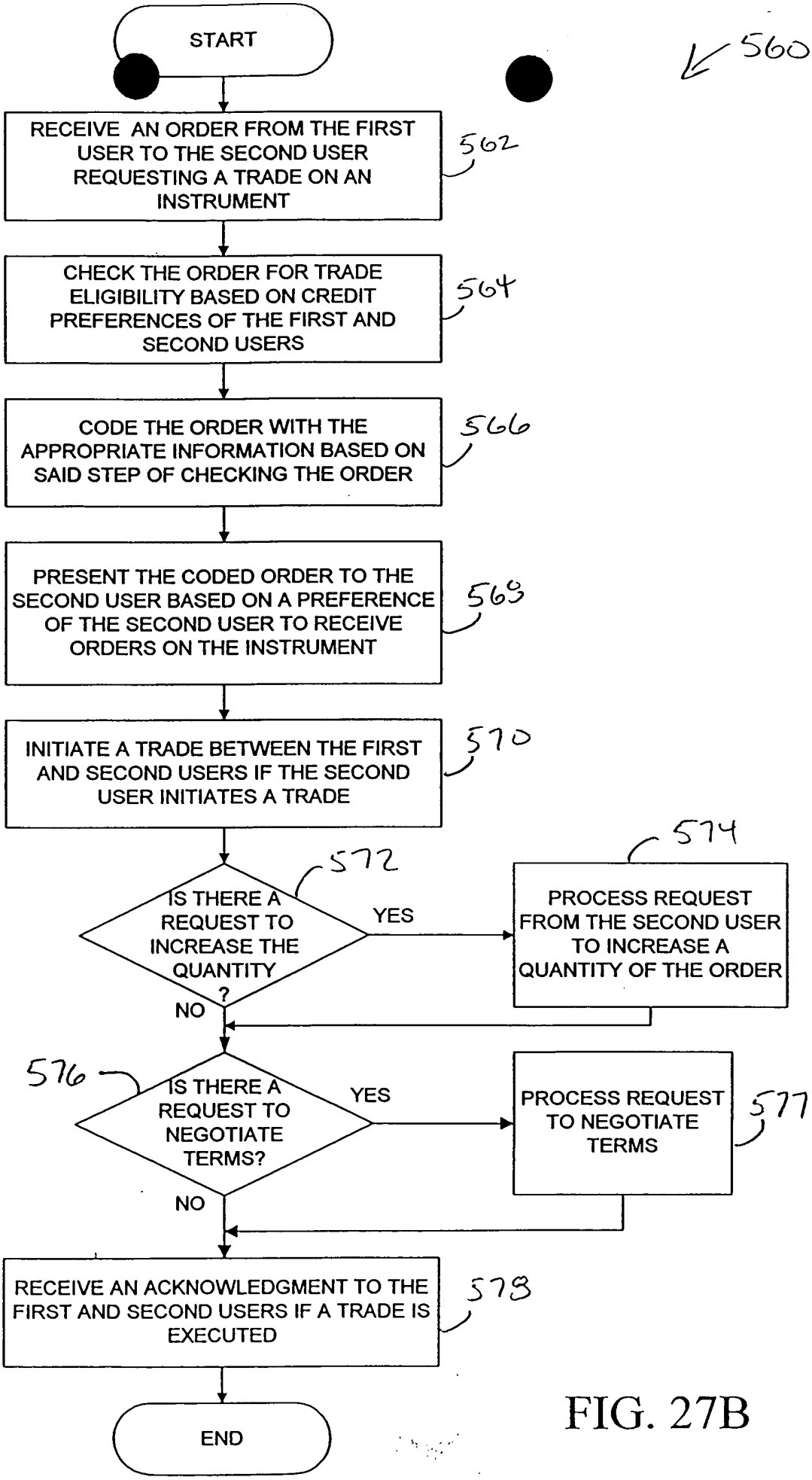
START
560
RECEIVE AN ORDER FROM THE FIRST USER TO THE SECOND USER REQUESTING A TRADE ON AN INSTRUMENT
562
CHECK THE ORDER FOR TRADE ELIGIBILITY BASED ON CREDIT PREFERENCES OF THE FIRST AND SECOND USERS
564
CODE THE ORDER WITH THE APPROPRIATE INFORMATION BASED ON SAID STEP OF CHECKING THE ORDER
566
PRESENT THE CODED ORDER TO THE SECOND USER BASED ON A PREFERENCE OF THE SECOND USER TO RECEIVE ORDERS ON THE INSTRUMENT
568
INITIATE A TRADE BETWEEN THE FIRST AND SECOND USERS IF THE SECOND USER INITIATES A TRADE
570
IS THERE A REQUEST TO INCREASE THE QUANTITY ?
572
YES
PROCESS REQUEST FROM THE SECOND USER TO INCREASE A QUANTITY OF THE ORDER
574
NO
IS THERE A REQUEST TO NEGOTIATE TERMS?
576
YES
PROCESS REQUEST TO NEGOTIATE TERMS
577
NO
RECEIVE AN ACKNOWLEDGMENT TO THE FIRST AND SECOND USERS IF A TRADE IS EXECUTED
578
END

FIG. 27B

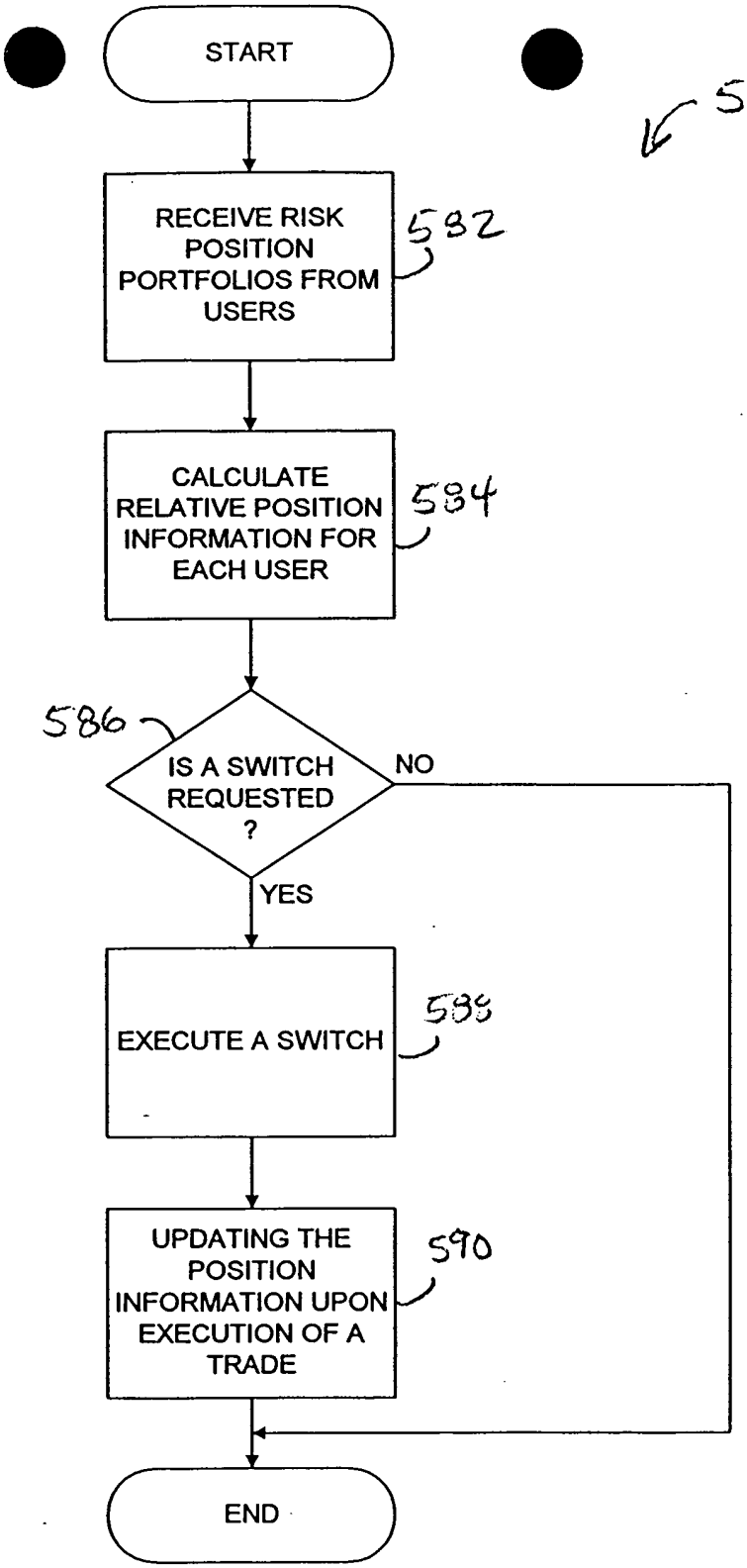
START
530
RECEIVE RISK POSITION PORTFOLIOS FROM USERS
582
CALCULATE RELATIVE POSITION INFORMATION FOR EACH USER
584
586
IS A SWITCH REQUESTED ?
NO
YES
EXECUTE A SWITCH
588
UPDATING THE POSITION INFORMATION UPON EXECUTION OF A TRADE
590
END

FIG. 28

05050-4005

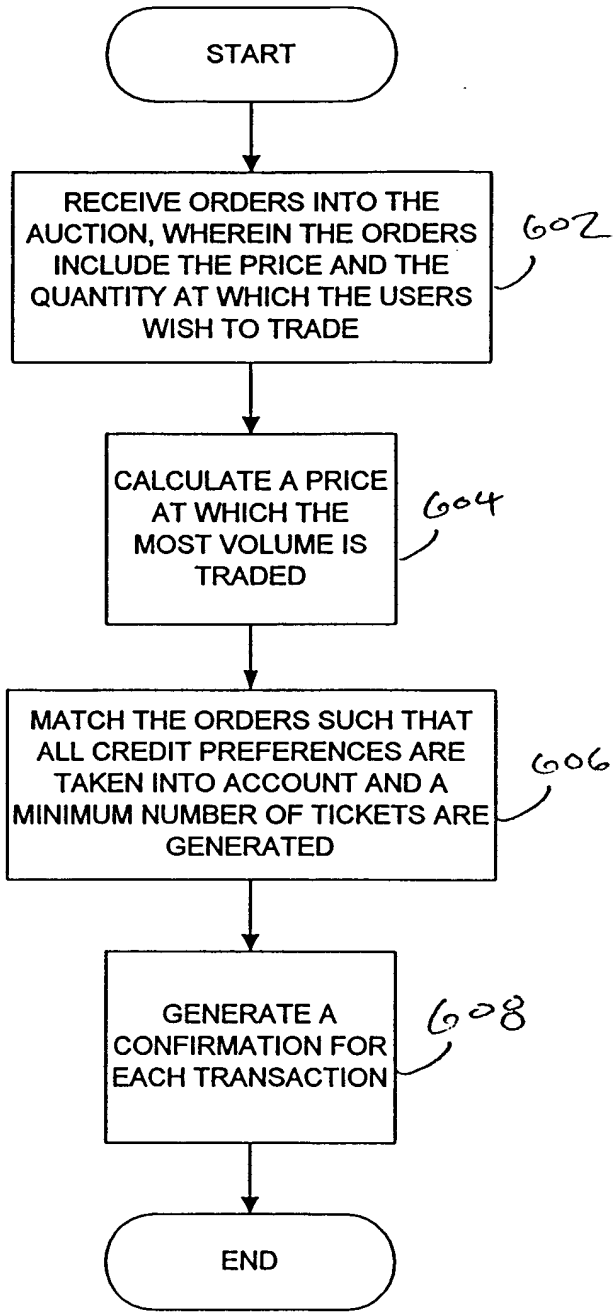

FIG. 29

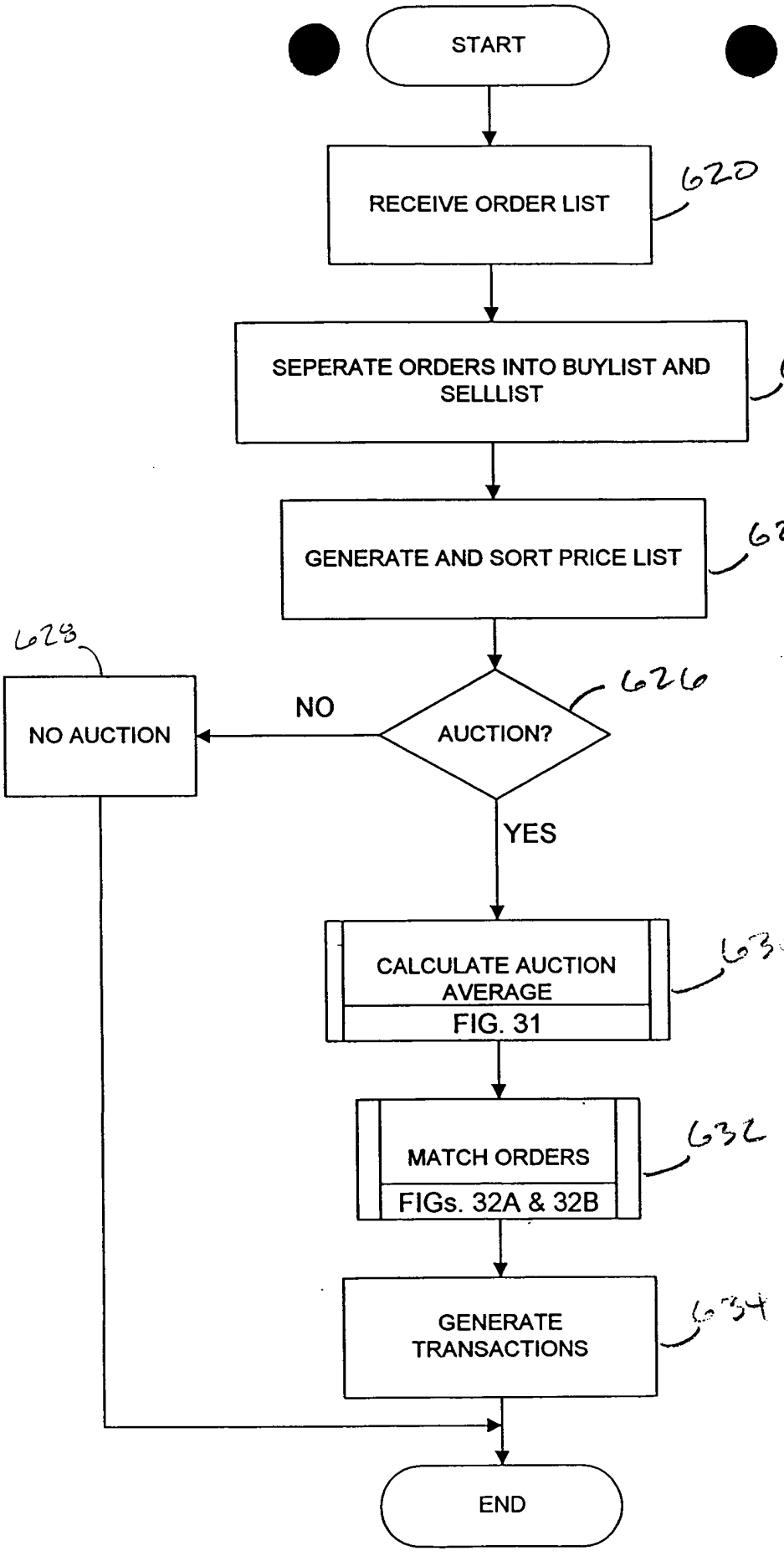
START
RECEIVE ORDER LIST
620
SEPERATE ORDERS INTO BUYLIST AND SELLLIST
622
GENERATE AND SORT PRICE LIST
624
626
AUCTION?
NO
628
NO AUCTION
YES
CALCULATE AUCTION AVERAGE
FIG. 31
630
MATCH ORDERS
FIGs. 32A & 32B
632
GENERATE TRANSACTIONS
634
END

FIG. 30

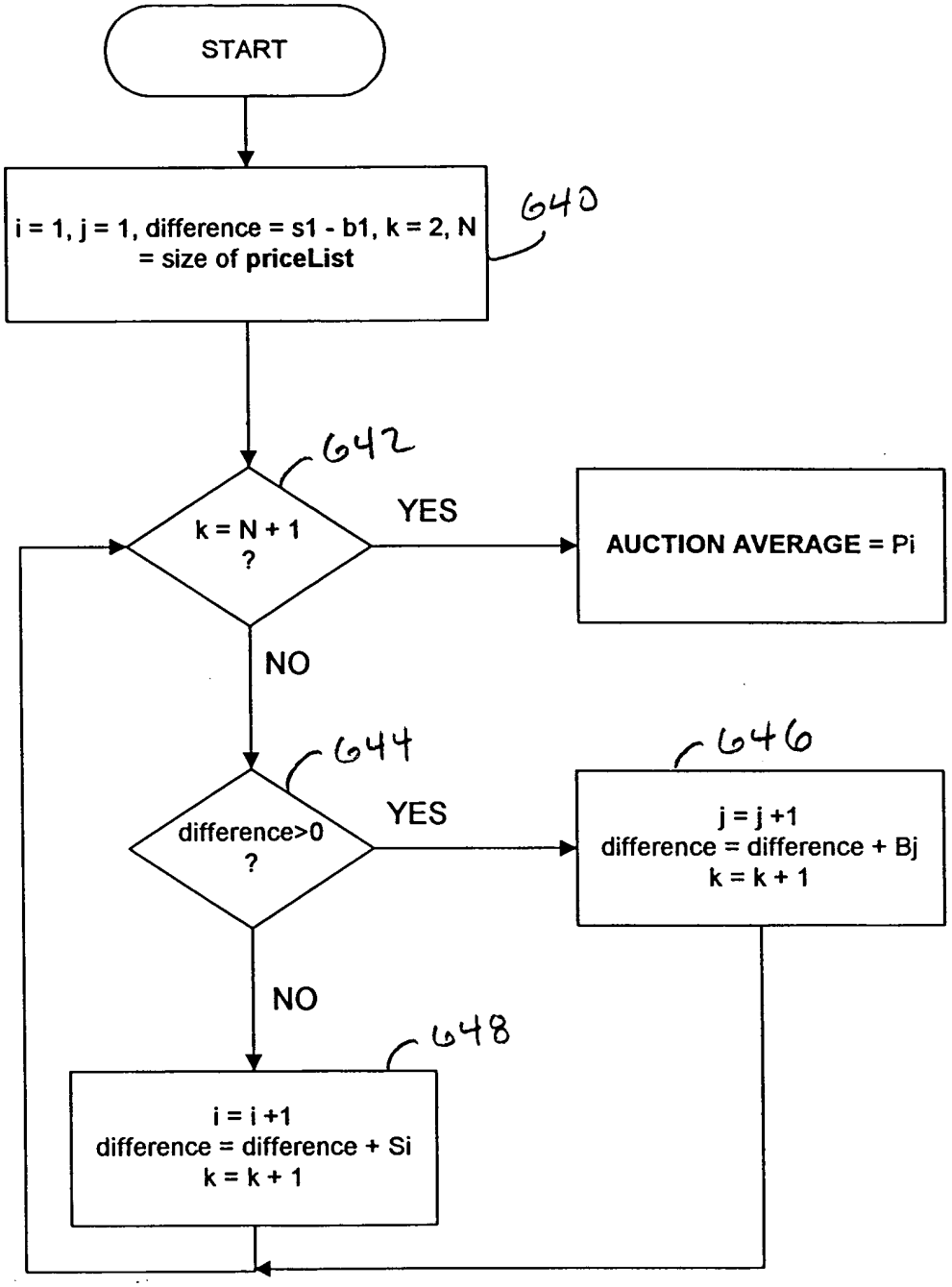
START
i = 1, j = 1, difference = s1 - b1, k = 2, N = size of priceList
640
642
k = N + 1 ?
YES
AUCTION AVERAGE = Pi
NO
644
difference>0 ?
YES
646
j = j +1
difference = difference + Bj
k = k + 1
NO
648
i = i +1
difference = difference + Si
k = k + 1

FIG. 31

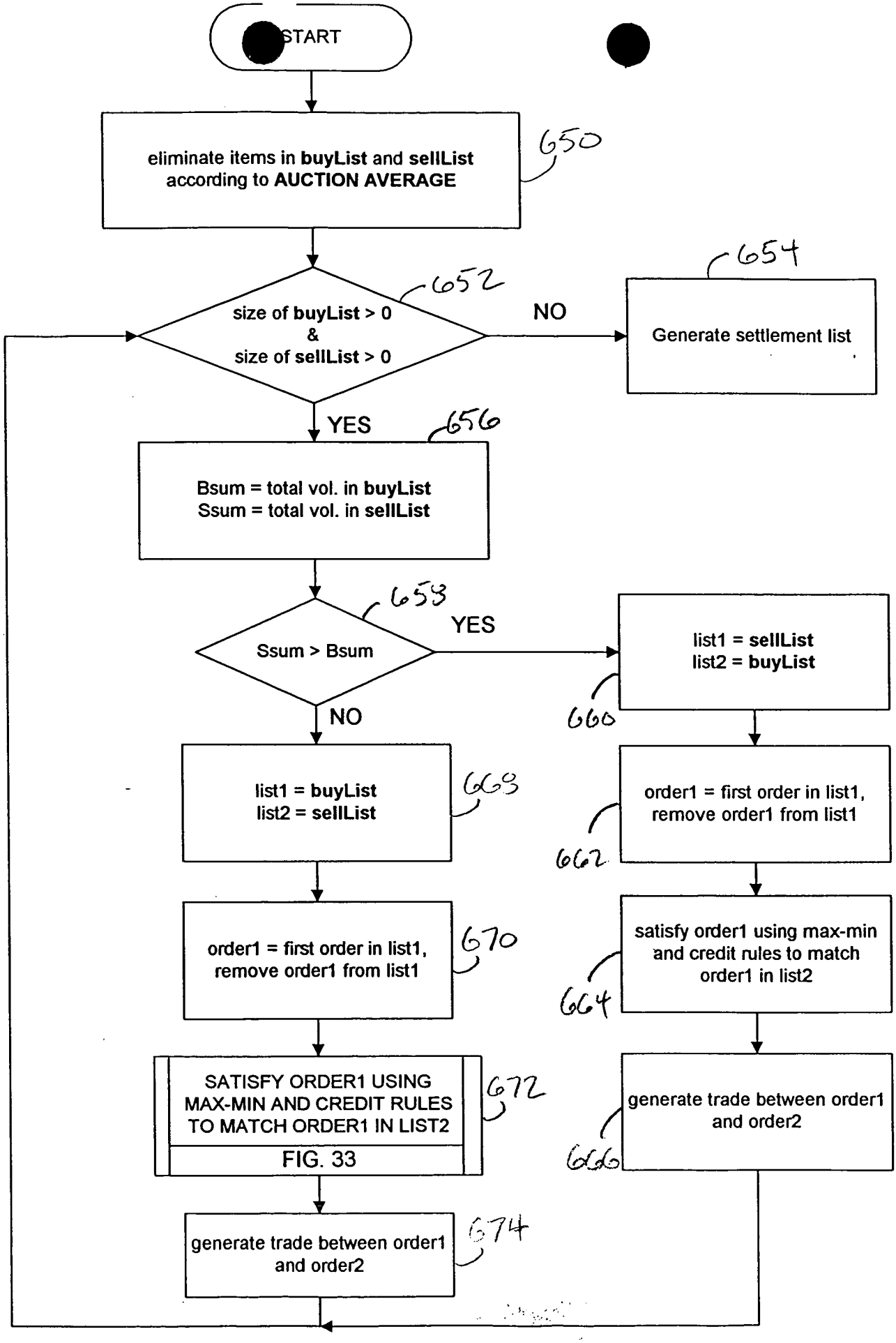
START
eliminate items in buyList and sellList according to AUCTION AVERAGE
650
size of buyList > 0 & size of sellList > 0
652
NO
654
Generate settlement list
YES
656
Bsum = total vol. in buyList
Ssum = total vol. in sellList
658
Ssum > Bsum
YES
NO
list1 = sellList
list2 = buyList
660
list1 = buyList
list2 = sellList
668
order1 = first order in list1, remove order1 from list1
662
order1 = first order in list1, remove order1 from list1
670
satisfy order1 using max-min and credit rules to match order1 in list2
664
SATISFY ORDER1 USING MAX-MIN AND CREDIT RULES TO MATCH ORDER1 IN LIST2
672
FIG. 33
generate trade between order1 and order2
666
generate trade between order1 and order2
674

FIG. 32

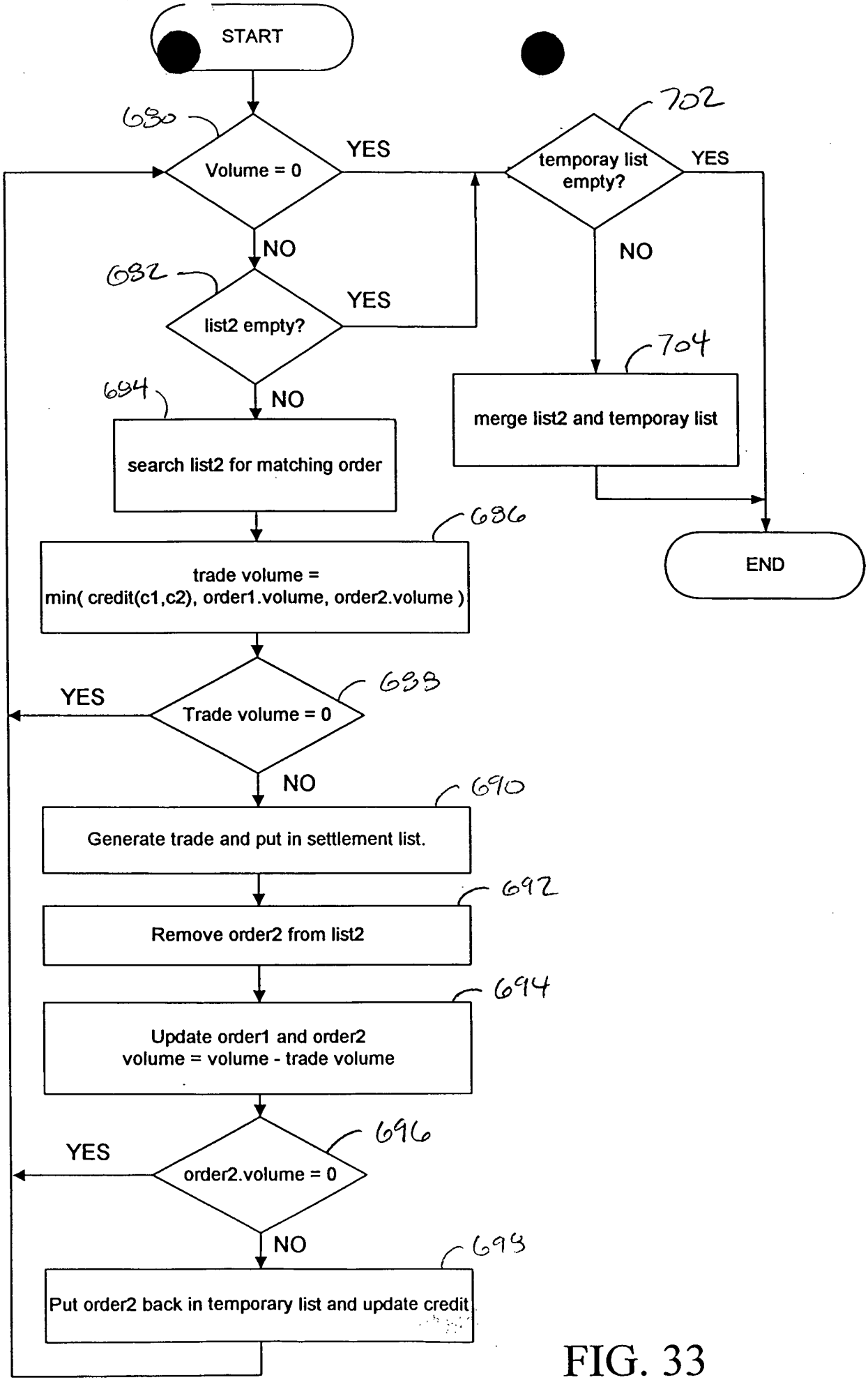
START
680
Volume = 0
YES
NO
682
list2 empty?
YES
NO
694
search list2 for matching order
686
trade volume =
min(credit(c1,c2), order1.volume, order2.volume)
YES
688
Trade volume = 0
NO
690
Generate trade and put in settlement list.
692
Remove order2 from list2
694
Update order1 and order2
volume = volume - trade volume
YES
696
order2.volume = 0
NO
698
Put order2 back in temporary list and update credit
702
temporay list
empty?
YES
NO
704
merge list2 and temporay list
END

FIG. 33

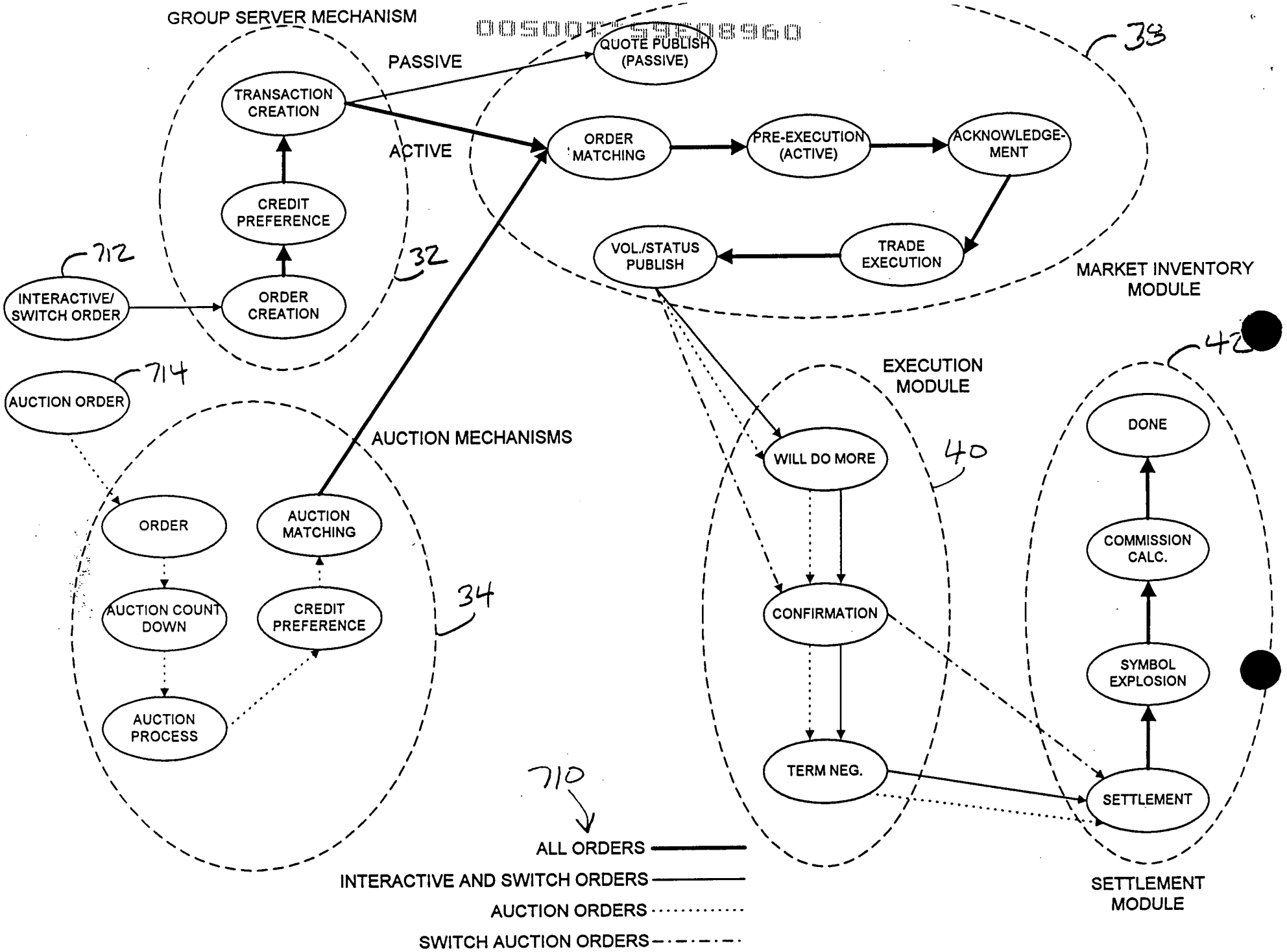
GROUP SERVER MECHANISM
PASSIVE
ACTIVE
TRANSACTION CREATION
CREDIT PREFERENCE
ORDER CREATION
INTERACTIVE/ SWITCH ORDER
712
32
QUOTE PUBLISH (PASSIVE)
ORDER MATCHING
PRE-EXECUTION (ACTIVE)
ACKNOWLEDGE-MENT
TRADE EXECUTION
VOL./STATUS PUBLISH
33
MARKET INVENTORY MODULE
AUCTION ORDER
714
AUCTION MECHANISMS
ORDER
AUCTION COUNT DOWN
AUCTION PROCESS
AUCTION MATCHING
CREDIT PREFERENCE
34
EXECUTION MODULE
WILL DO MORE
CONFIRMATION
TERM NEG.
40
DONE
COMMISSION CALC.
SYMBOL EXPLOSION
SETTLEMENT
SETTLEMENT MODULE
710
ALL ORDERS
INTERACTIVE AND SWITCH ORDERS
AUCTION ORDERS
SWITCH AUCTION ORDERS

FIG. 34